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Edited by G. PHILLIPS BEVAN, F.G.S., &c.



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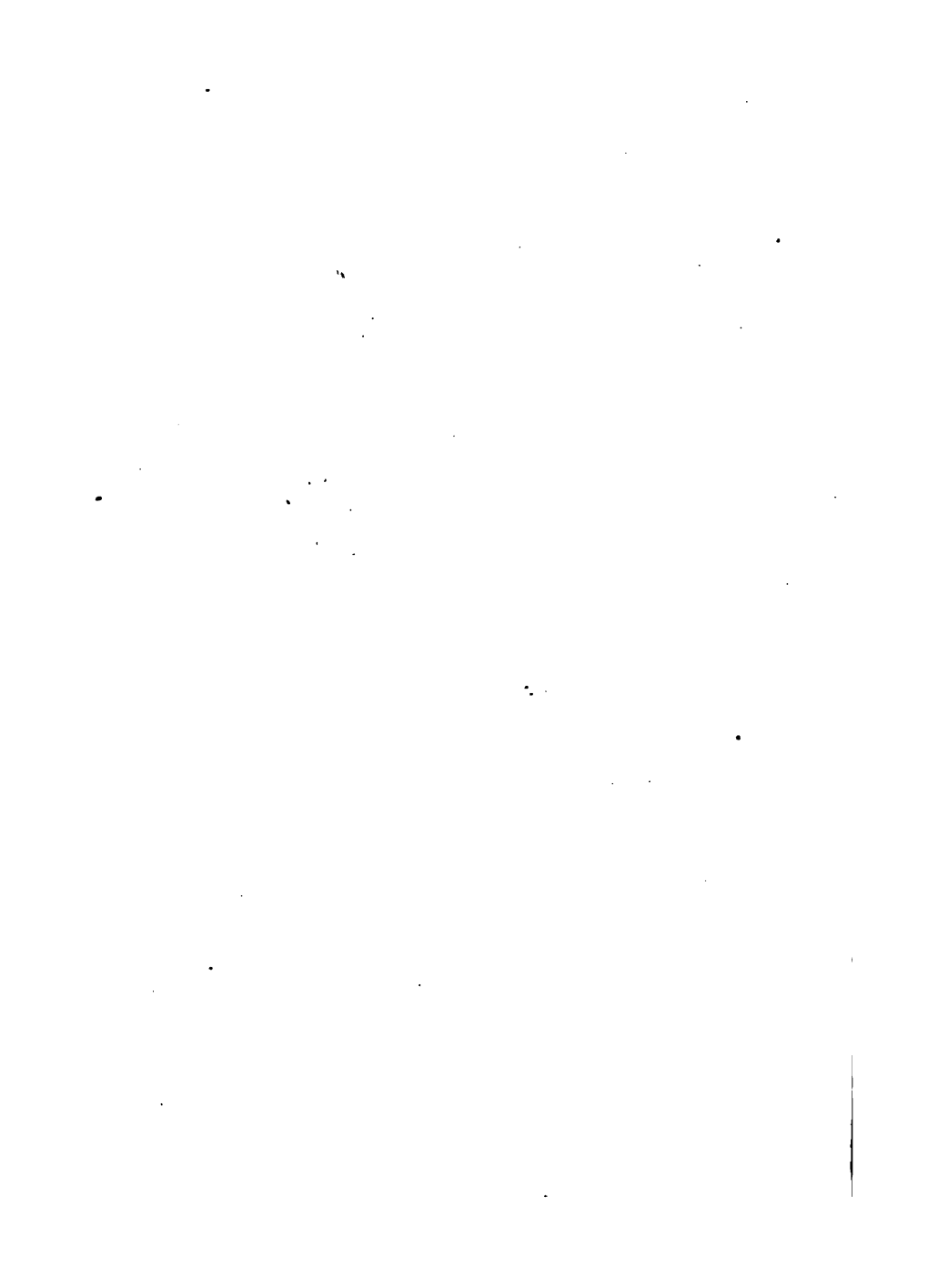
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HORTICULTURE.

BY

F. W. BURBIDGE,

AUTHOR OF 'DOMESTIC FLORICULTURE'; 'CULTIVATED
PLANTS'; ETC.

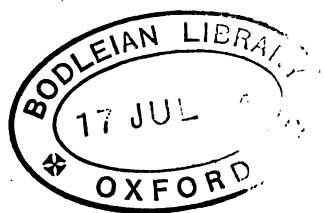
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*WITH ILLUSTRATIONS.*  
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LONDON:

EDWARD STANFORD, 55, CHARING CROSS, S.W

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1877.

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BRITISH INDUSTRIES.

COMMERCIAL GARDENING.

GARDENING, as a profitable industry, has made enormous strides during the last twenty or thirty years, and at the present time it absorbs an immense amount of capital and skilled labour in, or near, all our large towns, where we now find men of means investing money in choice orchids, ferns, and other exotic decorative plants, as well as in tasteful dwellings, fine pictures, or other works of art. Commercial gardening may be summarized as follows:

1. Importation and culture of new and rare exotic plants, shrubs, and trees.
2. Hybridization, or artificial origination of new plants, fruits, and vegetables.
3. Culture of decorative plants and cut flowers.
4. Fruit, vegetable, and seed culture for market.

And to these general departments may be added the enormous trade in collateral horticultural products and appliances, to which I shall more fully allude elsewhere. So long as we enjoy peace and commercial prosperity, the introduction and sale of

beautiful decorative plants will continue as profitable, or even more so, than the production of necessities in the way of fruit and vegetables, and so long shall we find our Veitchs, Lows, Bulls, Van Houttes, and Vilmorins ready to employ an enormous amount of accumulative capital in sending abroad collectors, and in increasing, improving, and disseminating their discoveries here at home. A visit to any large nursery, say that of Messrs. Veitch and Sons, in the King's Road, Chelsea, for example, will be amply sufficient to show that the trade industry of gardening is a most important one. In many of our leading metropolitan nurseries, the capital employed varies from 10,000*l.* to 50,000*l.*, or even more, and it is a matter of some surprise to find that these large sums are invested in plants and seeds, together with appliances for their cultivation and distribution. One of the most profitable branches of the nurseryman's business of late years has been the collection and importation of the Indian and South American orchids, lily bulbs from America and Japan, and seeds of various kinds, notably those of the American conifera, all of which have found as ready and remunerative a sale at Steven's Auction Rooms, near Covent Garden Market, as have the apples, oranges, bananas, pine-apples, and other food products sold weekly in such enormous quantities at Keeling and Hunt's, and Grant and Gask's, in Monument Yard and its neighbourhood. In many cases the improvement of foreign introductions by means of hybridism, or cross breeding, has been adopted by trade cultivators with advantage,

notably the Indian and American rhododendrons, calceolarias, pelargoniums, camellias, and other popular flowers; and even now, notwithstanding the increased intelligence of professional gardeners and amateurs, nursery growers still rely on their superior skill and appliances in the way of plant propagation and cross breeding, to render their home trade profitable. Many thousands of acres of land in this country, and also in France, Belgium, Holland, and Germany, are devoted to the production of flower and other seeds of various kinds for our gardens, and here, as a rule, the nurseryman or seedsman is the middleman who buys seeds in bulk from the grower or his agent, after which he packs and prepares them for distribution to his customers. The adulteration of garden and other seeds has of late years been made a subject for legislation, but still the practice largely prevails; sometimes it is the grower who is at fault, but more generally adulteration takes place after the goods leave his hands. A common plan of adulteration is to kill inferior seed by baking or other processes, after which it is sold as "ooo" for mixing with good seeds. Some English growers harvest vegetable and the more hardy sorts of flower seeds on their own farms, the more tender kinds being purchased in quantity from the German or Dutch growers. The culture of fruit trees is not now so remunerative, as I hope it will be, when the demand becomes greater, which it assuredly will, as soon as residents in districts in which good land is cheap, fully recognize the importance of fruit growing as a food-producing industry. This would have

long ago been the case, had the elements of gardening been taught in our schools as it is in those of continental countries; indeed, a national garden, established on sound principles, in which to test all kinds of fruits, vegetables, and flowers, would not only be the means of preventing the sale of adulterated seeds, or old sorts at high prices under new names, but would form an excellent school of horticulture, and would give an immense impetus to gardening as now practised in this country.

In Kent, Surrey, Middlesex, and Hertfordshire hundreds of acres are devoted to the culture of fruit trees, roses, rhododendrons, and ornamental trees and shrubs of all kinds for garden ornaments, and immense quantities of fruit come to our London markets from what are called the home counties, but principally from Kent, Herts, and Middlesex, where most landed proprietors prefer letting their land for gardening purposes, knowing, as they do, that it will be well cultivated, and that it will yield them at least 50 per cent. more rent than if let for farm culture. The influence of trade gardening on the labour market is, on the whole, a beneficial one. In all the great fruit and vegetable growing districts there is a periodical, and in many cases, a constant demand for the assistance of women and boys in fruit picking, flower gathering and bunching, or otherwise preparing vegetables for market. All our great nursery establishments are in some measure schools for the hundreds of young gardeners employed in them, and from which they are sent to private gardens throughout the country, or to

the colonies, as openings occur in the tea, coffee, vanilla, or cinchona plantations, established either by Government or private speculators. At the present time many thousands of pounds are spent for garden labour, but there is no good reason why our thousands of acres of railway embankments and much of our elsewhere uncultivated land should not be devoted to some branch of spade husbandry, in which case the amount now paid for labour would be ten times as much as that expended at the present time.

FRUIT CULTURE.

Our trade in imported fruits and vegetables is by many supposed to be of modern date, but in reality many of the fruits and vegetables now commonly cultivated in our gardens were imported from the Continent for the tables of the rich, long before they were cultivated in their gardens, and this was especially so in the case of peas and salads, apples, cherries, and other hardy fruits. Orchards for the sale of fruit were first organized by the fruiterer to Henry VIII., and among the useful plants which had long been neglected in English gardens, were the culinary vegetables, which, however, began to be pretty generally grown in that monarch's gardens at Richmond and at Greenwich, where melons and cucumbers were forced as they had been at Rome some 1500 years before. Grapes, peaches, and apricots were also about this time established on a "14-foot wall at Nonesuch." A new continent gave us soon after this time the potato, and sent the tobacco plant and maize to grow in future side by side in many countries of the Old World, while the eastern hemisphere conferred on the west its apples, pears, and peaches, with its bread fruit and bread corns—wheat, rice, and millet. The mango came later still to the far west, and the delicious "No. 11," and the "No. 132," so justly prized in

Jamaica, retain as their names the numbers with which the specimens were labelled in the collection captured in a French Indiaman by Rodney, and taken by him into Kingston harbour.

America had few indigenous fruits adapted to our gardens. But let us be grateful for the pine. Evelyn, who "first taught gardening to speak proper English," was present at the banqueting house at Whitehall, when Charles II.'s gardener Rose, on bended knee, presented His Majesty with the first queen pine grown in England, and as pines and forced fruits soon began to be grown for sale after that, we may conclude that English gardens henceforth supplied English tables with vegetables, if not with fruits, without the help of foreigners, who again send so much to our markets. The time of the Reformation may be taken as the birth of economic or industrial gardening in this country, for although Tusser, in his 'Five Hundred Points of Good Husbandry,' mentions one hundred and fifty sorts of fruits and plants grown in gardens, including all the common vegetables, yet "kitchen garden wares" continued to be imported from Holland, and fruits from France, until market gardens began to furnish reliable supplies about the year 1600; "before that date," says Fuller, "we fetched most of our cherries from Holland, apples from France, and hardly had a mess of rath-ripe peas except from Holland, which were dainties for ladies, they came so far and cost so dear. Since, however, gardening hath crept out of Holland to Sandwich, in Kent, and thence to Surrey, where, although cultivators have given 6*l.* an

acre and upwards for their land, they have made the rent, lived comfortably, and set many people on work."

Although the imports of vegetables diminished after the establishment of market gardens two or three centuries ago, this was not the case with fruit imports, which, on the other hand, seem to have steadily increased, and in 1818, Mr. Salisbury, in his '*Hints to Orchard Fruit Growers*,' informs us that he saw 20,000*l.* worth of imported apples in one day in Covent Garden Market and in the fruit warehouses, then in Fleet Street. At the present time we are paying a sum of 6,000,000*l.* annually for imported fruits alone, and yet news reaches us from the Continent, that fruit culture is being rapidly extended in many agricultural and pastoral districts, so satisfactory to the fruit growers are the prices now realized in our markets. France, Jersey, Holland, Spain, Portugal, and Turkey send us grapes, melons, and figs; the great bulk of our imported apples comes from France and America; pears from France and the Channel Islands (from Jersey we annually receive 7*l.* worth of potatoes per acre for the entire acreage); and during the earlier part of the season, when strawberries, cherries, and plums fetch good prices, our own growers have but a poor chance of competing with the continental cultivator, who, in addition to a sunny climate, cheap labour and transit charges, and in most cases freehold land, brings a vast amount of intelligent ability to bear on fruit culture as a profitable industry.

Now that the acreage of our wheat and potato crops is decreasing year by year, and the production of meat

is yearly becoming more risky and less profitable, it is a matter of great moment, that the importance of gardening as a food-producing industry should receive that attention which it so well deserves. That we should import apples and other hardy fruits to this country at a yearly cost of nearly 2,000,000*l.*, is all the more remarkable, when we consider how many thousands of acres of cultivated land are annually devoted to a far less remunerative industry, viz. timber growing, when thousands of acres are left waste which might be made most profitable for fruit culture. Our present land and game laws have much to do with the conservation of uncultivated waste land, so that in reality they are in some measure the cause of our expending so much every year for food products of all kinds. It is singular to observe, that the nominal prices of fruit have undergone but little change during the past thirty years, as shown by the retail lists of prices, one of which, for the 24th of December, 1842, is now before me, in which hot-house grapes are quoted at prices varying from 4*s.* to 7*s.* per lb.; Spanish fruit 9*d.* to 1*s.*, and Portugal 1*s.* to 1*s.* 6*d.* per lb.; pine-apples are valued at 3*s.* to 5*s.* per lb.; dessert apples 2*s.* 6*d.* to 7*s.*, and culinary sorts 2*s.* to 6*s.* per bushel; forced asparagus, 8*s.* to 10*s.* per 100 heads, second quality 3*s.* to 5*s.* per 100; seakale 1*s.* 9*d.* to 2*s.* 6*d.* per punnet; rhubarb 1*s.* 9*d.* per bundle; mushrooms 6*d.* to 9*d.* per punnet, and other produce in proportion; and on comparing these prices with lists of the present date the figures are nearly the same, though of course all kinds of produce are now much dearer than in 1842, since the purchasing power of money is

now less by 30 to 40 per cent. at least than at that date. A great difference is observable in potatoes, which in 1842, or three years before the outbreak of the disease, were quoted at from 40s. to 70s. per ton, while at the present time, they are selling at prices varying from 100s. to 160s. per ton, notwithstanding that our imports of potatoes are enormous. This is shown by the Government returns, where we learn that the principal countries that supply us with potatoes in bulk are Germany, Holland, Belgium, France, Portugal, Malta, and the Channel Islands, the total value of the produce sent to our markets being 1,070,976*l*. Now that we have an ever-growing population of 30,000,000 people to feed, and according to the latest reports only about 40,000 acres of land specially devoted to vegetable gardens, the produce of which is regularly marketed, it need no longer surprise us that our trade in imported fruits and vegetables should be expanding year by year.

The orchard, or hard-fruit growing, area of Great Britain is given as being only 154,584 acres, or less than half the return for the American State of Illinois alone, where an area of 334,067 acres is occupied by orchards. Notwithstanding enormous imports, however, current prices are maintained, or rise rather than fall, so that it seems that the demand still exceeds the supply; nor is this demand altogether owing to increasing population, but rather to a growing taste for fruit and vegetables as articles of food among the more intelligent of our labouring population, who, it must be remembered, influence the sale of food commodities far more than the wealthier classes.

ACREAGE UNDER ORCHARDS, MARKET GARDENS, AND NURSERY
 GROUNDS IN ENGLAND, WALES, AND SCOTLAND, IN THE
 YEAR 1875.

	<i>Orchards, &c.</i> Acreage of Arable or Grass Lands, but used also for Fruit Trees of any kind.	<i>Market Gardens.</i> Land used by Market Gardeners for growth of Vegetables and other Garden Produce.	<i>Nursery Grounds.</i> Land used by Nurserymen for growing Trees, Shrubs, &c.
Total for England ..	150,600	35,364	9,837
Total for Wales!.. ..	2,535	712	463
Total for Scotland ..	1,449	2,881	1,742
Total for Great Britain	154,584	38,957	12,042

Note.—The greater part of the acreage of orchards and some part of the acreage of market gardens is included in the general returns under separate crops of grass.

There were, in 1873, 246,000 allotments of land in Great Britain, of which 242,000 were in England, 1700 in Wales, and 2100 in Scotland. The practice of letting land in small allotments detached from cottages is not so common in Wales and Scotland as in England; and, even in England, allotments are comparatively few in the northern districts. The total extent of land let in garden allotments in Great Britain in 1873 was 59,631 acres, which shows almost exactly an average of a quarter of an acre for each allotment; and the average for England is the same. The average size of allotment varies, however, in the different English counties. In twenty-four counties, in which there were altogether 122,000 allotments, the average size may be said to vary from one-eighth to a quarter of an acre. In eighteen counties, in which there were

altogether 120,000 allotments, the average size may be said to vary from a quarter to half an acre. One-eighth of an acre is the quantity of land, usually considered to be as much as can be thoroughly cultivated by an employed labourer in his spare time.

The best and most remunerative system of earth culture is undoubtedly that known as gardening, and as all food is of the earth—earth itself in fact in its more refined forms—it follows that we shall never reap the fulness thereof, until as much of its surface as is possible shall have been brought into a highly cultivated or garden-like state. Even at present we see that well-populated countries have very few of the food products of horticultural industry to spare, and this is especially true of our own land, where we not only consume all our garden produce, but expend several millions sterling every year in importing fruits and vegetables from less populated parts of southern Europe and America. A glance at the Parliamentary Agricultural Returns will show, that the area of our wheat and potato crops is gradually becoming less, year after year, partly because the cheapness of land and transit enables the cultivator on the American prairies, and of other countries, to compete with our own more heavily-weighted corn growers to advantage. Again, in the production of meat, the apparent profits are very small; and in point of fact, there is in this kind of food culture an actual loss, since every fat animal is only the representative—a useful and highly necessary representative—of a much larger amount of vegetable food which it has consumed during its

growth. In order to grow and fatten a bullock, we require at least the produce of two acres of good land for three years, after which the animal is worth from 20*l.* to 30*l.*; while on the same land we could have grown at least 100*l.* worth of vegetables and fruits.

In the face of an ever-increasing population, and notwithstanding the fact that our bread, and meat, and butter, and cheese can be grown for us abroad, for the present at least, cheaper than we can grow them at home, it becomes a very serious question how we shall best raise food on our own soil; and to this question an answer was recently given by one of our leading horticultural writers, who wisely recommends that we devote a larger area to gardening industry, and adds:

“The prospects of profits here are brighter than in the meat and corn line. The risk is less, the profit greater, the demand a growing one, and the trade in a most elastic condition. Every year now, indeed, we are growing more fruit, but then at the same time we go on consuming more still. Parallel with our enlarged home-production there is an expanding foreign trade in fruit, now amounting to a very large sum of money; and yet the fruit trade may be said to be still in its infancy, for fruit has hardly yet been looked upon or consumed as food, or a substantial article of diet in this country. When we have advanced so far as to make one meal a day off fruit and bread, the consumption of fruit will be multiplied a hundred-fold, and our present supply prove inadequate in the same ratio.”

This is not an over-sanguine estimate, and the demand for one hundred times more fruit than is now used in England would have a powerful effect upon the cropping of land, the practice of farming, and the price of meat. Were it possible, and it is so by a fruit diet, sensibly to lower the price of meat, that would give a further stimulus to fruit culture, for if meat growing is not profitable at present prices, it would be less so at lower rates, and fruit might displace roots and grass as well as wheat, and prove at once the most profitable crop on many farms, as it now is in so many gardens. In fact, with the statements of profits or returns—a very different thing, however—given as ranging as high as 100*l.* per acre, it is surprising that so little fruit is grown.

That the cultivation of fruit is a most profitable industry can readily be proved, without having recourse to returns that cannot be authenticated if necessary. The high price given for land for fruit culture in the neighbourhood of the metropolis and other large towns and the thriving state of the home fruit-trade, notwithstanding the keen competition of foreign countries more favoured by climate, at lower prices of labour or the cost of production, is proof positive that its cultivation on good lands, at average agricultural rents, must pay extremely well. For railways have, in regard to such perishable matters, almost abolished distance; and fruits sent 100, 200, 400 miles are daily arriving in Covent Garden Market as fresh and fair as those that come up in vans from Ilford or Fulham; in fact, the American fruits that cross the

Atlantic, and that have perhaps travelled hundreds of miles to or from port, look nearly as free from blemish as those of home growth. The cost of transit is, of course, considerable, but that would be paid many times over by the difference of rent between metropolitan and rural districts; and no doubt, in the future trade of the country, fruit trains will be as numerous and as common as our meat, milk, and fish "specials" now are. All this will follow as a matter of course, when fruit takes the place, to which it is entitled in the feeding of the people.

The various powerful tendencies of modern trade and life, seem to point strongly towards a larger consumption of fruit; it is alike the duty and interest of horticulturists to take the initiative—as regards providing larger numbers of good fruit trees than we now have, and also furnishing the markets more freely with fruit of better quality. For although it is perfectly true that demand begets supply, yet it is equally true in the case of some commodities, that the supply originates the demand. Fruit is emphatically one of these, and there cannot be a doubt that were more and better fruit offered at cheaper rates, it would readily find purchasers and consumers. The trade in fruit trees is already one of the most important branches of horticulture; but should necessity be laid upon us to use more fruit as food, and the fashion once set in towards this great innovation and improvement, an enormous demand will be created, that will task the ability and resources of the trade to the uttermost to meet and satisfy. It may, therefore, be wise and

prudent to anticipate this demand, so as to be able to guide it into the most useful channels, and satisfy it with the best materials.

One of the largest fruit-growing establishments in this country is near Pershore, in Worcestershire, where a Mr. Varden, who holds an estate of 250 acres, has about 140 acres of fruit trees. These include 60,000 gooseberry bushes, 100,000 currant trees, and about 6000 plum trees, besides several hundreds of apple, pear, and other trees. The extent of the labour in fruit gathering, &c., may be estimated from the fact, that for weeks together during the fruit season, four or five tons of fruit are sent away from this garden, and as many as seven tons of currants have been sent off in one day. The aim of Mr. Varden is to obtain as good a profit as can be made off a certain area, and to attain this he spares no pains in well tilling the ground, in growing the best fruit only, and in planting only such sorts as are suited to the soil and climate of his particular district. That fruit growing may become a remunerative calling to any person of intelligence having a capital of from 100*l.* to 1000*l.* has been proved by the direct experiments of the Rev. William Lea, M.A., whose work entitled '*Small Farms: How they can be made to answer by means of Fruit Growing*,'* is one of the most concise and valuable of any hitherto published on this branch of cultural industry. Mr. Lea's experience is briefly told in the following extract:—

* '*London Journal of Horticulture.*' Office: 171, Fleet Street, E.C.

"In 1864 I bought three acres of land, and having long had a hobby of my own in favour of small farms, I commenced to ride it at once, with a view of seeing how far such farms might be made to pay if planted with fruit. One portion I devoted to specimen trees of various kinds; apples, pears, plums, gooseberries, with a view of ascertaining the sorts which would make the best return, if planted in quantities. On another portion I experimented with vegetables, and on a third portion I made a plantation of gooseberries, black currants, and plums, and sold the produce. It is of this third portion, as nearly as possible one acre in extent, that I purpose to give an account. I first cleaned and double-dug the land, made a broad walk up the middle, and then planted it with bushes six feet apart, in rows six feet from each other. Among these I planted plums, some twenty-four, others only twelve feet apart. My stock consisted of 800 gooseberries, 320 black currants, and 110 plums, 1230 in all; the exact number to an acre, planting at six feet apart, is 1225. For the first three years I had room for three lines of potatoes or other vegetables between the rows; then, as the bushes increased in size, for two, and in the last and seventh year, for one line only. In three or four years more the bushes will have entirely covered the ground, and there will be no more room for vegetables, but by that time I expect that the trees alone will produce a very good return. It may be interesting to give the prices of each kind of fruit, and the amount for which the produce sold in each of the seven years, bearing in mind that the acre was

planted with 800 gooseberries, 320 black currants, and 110 plums, and that a pot of gooseberries is expected to weigh 90 lb., a pot a plums the same, and a pot of black currants 63 lb.; the pots, i. e. the baskets in which they are packed, included. I should also mention that some sixty of the black currants when planted were large bushes.

1865.

	£	s.	d.
The crop of gooseberries at 5s. 6d. per pot produced	0	11	0
Black currants at 10s.	1	7	6
Plums	0	0	0
	<hr/>		
	£1	18	6
	<hr/>		

1866.

	£	s.	d.
Gooseberries at 8s. per pot	0	18	0
Black currants at 12s. 6d.	2	8	6
Plums	0	0	0
	<hr/>		
	£3	6	6
	<hr/>		

1867.

	£	s.	d.
Gooseberries at 7s. per pot	8	8	8
Black currants at 10s.	2	7	0
Plums	0	0	0
	<hr/>		
	£10	15	8
	<hr/>		

1868.

	£	s.	d.
Gooseberries at 5s. per pot	7	10	0
Black currants at 10s.	2	4	0
Plums at 7s. 6d.	1	2	6
	<hr/>		
	£10	16	6
	<hr/>		

1869.

	<i>£</i>	<i>s.</i>	<i>d.</i>
Gooseberries at 6s. per pot	12	18	0
Black currants at 10s. 6d.	4	12	6
Plums at 4s.	4	6	6
	<u>£21</u>	<u>17</u>	<u>0</u>

1870.

	<i>£</i>	<i>s.</i>	<i>d.</i>
Gooseberries at 8s. 4d. per pot	17	2	0
Black currants at 9s.	4	12	0
Plums, white at 3s., red at 6s.	6	12	0
	<u>£28</u>	<u>6</u>	<u>0</u>

1871.

	<i>£</i>	<i>s.</i>	<i>d.</i>
Gooseberries at 10s. per pot	13	0	0
Black currants at 15s.	9	5	0
Plums, white at 5s., red at 10s.	9	7	6
	<u>£31</u>	<u>12</u>	<u>6</u>

"It will be seen from this account, that the price of fruit varies according to the season. During the last seven years gooseberries have been as high as 10s., and as low as 5s. per pot; black currants have been as high as 15s., and as low as 9s.; plums in like manner have varied in the same proportion, but the price of gooseberries depends upon another condition besides the quantity of the crop; the time at which the gathering begins is an important item. If the gathering does not begin till June, 6s. per pot will be as remunerative a price to the grower as 10s. would be, if the gathering were commenced in the middle of May."

A very important question in connection with this subject is, whether gardening might not be substituted with advantage for the ruder and less productive systems of farm culture. Every year, indeed, improvements are taking place in the culture of farms, and in many cases those near our large towns are devoted in a great measure to the production of garden produce with the best results. The main difference between garden and farm culture consists in the one being more refined than the other; and, as a natural consequence, when the object in view is profit, garden culture gives a more remunerative return, simply because here we have capital and intelligence employed in a more concentrated form. Thus, the labour and capital expended on a corn and meat farm of ten acres may be represented by 10*l.* per acre, equal 100*l.*; while that in a well-cultivated garden of two acres may be equal to 50*l.* per acre, or 100*l.* Now, in the first case, under the best management we gain a profit of say 10*l.* per acre, or 100*l.* for the ten acres; but a well cultivated garden of two acres will produce fruit and vegetables worth 100*l.* per acre on an average for ten years, and the realization of this fact has led not a few of our best farmers to introduce the culture of small fruits and vegetables on their farms. It is not at all surprising that the refined and intelligent culture of the soil proves the most remunerative, but there is a limit to the labour and capital which can be devoted to the soil, looking at the matter from a purely utilitarian point of view. Cheap, that is, comparatively cheap, production is indeed one of the essential points

which must needs be adopted by all who look to profit by garden industry of all kinds, since we have to compete with the world as well as with our neighbours; and our competitors, mostly small landed proprietors in Southern Europe, have the advantage of climate, their land and labour power being as cheap or cheaper than ours. Hence, to compete with these, we must use our labour more effectively by raising larger crops than they do with the same or a less amount of labour.

There is, however, a point in production beyond which we cannot go with profit. The American fruit grower, who obtains four hundred bushels of fruit every other year for twenty years from his rich, cheap soil without manure, and with a minimum of labour and cost, can easily compete with the English grower, who pays an annual rent equal to the whole purchase money of his competitors' land, and has to spend fully as much more in manure and labour. But if the western grower should, by fertilizing his land, double its yield, the extra four hundred would not be grown at a profit. Here is a principle which affects our whole agriculture, and no rules can be safely laid down for us which violate this principle. We must discover the limit of the profitable production of our land, each for himself, and avoid any attempts to pass that limit. The whole secret of good and profitable fruit or vegetable culture is to extend the limit of remunerative production as far as possible; it is bad and unprofitable to either fall below that limit or to go beyond it. There are instances in which an extremely large yield

is grown at a positive loss, as in the case of a grower who raised one hundred bushels of corn per acre with the expenditure of 21*l.* worth of manure and labour, while he raised sixty bushels without the manure and with less than half the labour. Thus it will be seen that the most productive returns are not necessarily the most profitable ones.

Food of all kinds is year by year becoming more costly, partly owing to the increase in our population, and perhaps partly owing to labour and capital being withdrawn from the cultural or food-producing to the manufacturing arts; but it is highly essential to our life and health that this state of things should be remedied, and to do this we must have the intelligent culture of the soil extended so as to obtain a more abundant supply of the most refined and valuable of all the earth's produce, and this could scarcely be better done, than by utilizing the idle and criminal portion of our population in the cultivation of our waste land. Let us not forget that the same soil which produces the thistle and wild brier, will grow roses, and that wherever crab and thorn trees grow in our thickets and by our waysides, there may some of the finest varieties of apples and pears be grown with success. The thousands of acres of land now lying waste beside our great iron roads could not better be utilized than by planting fruit trees. This once well done would prove a most lucrative investment.

Common hardy fruits may be bought in many parts of Switzerland at one halfpenny per pound. How is it, it may be asked, that we do not attempt fruit

culture on the same scale? "So long," says a correspondent of the '*Journal of Horticulture*,' "as tenants are not more efficiently protected or reimbursed for the improvements carried out on their land, so long will fruit cultivation, on an extensive scale, remain in its infancy. In the country referred to, the land is divided into small holdings, each occupier being the owner; consequently, he is constantly endeavouring to make the most of his plot. All his land, whether pasture or under tillage, is planted with fruit trees, tall standards, so as to admit the oxen with the plough to pass beneath them. You may see the peasant trudging home with, perhaps, a dozen of young trees on his back to fill up any vacancies, or to stock a fresh piece of land he has acquired. Lanes and highways in this country, dotted here and there with pollard, ash, or crooked elms, are there advantageously lined with walnuts, apples, cherries, &c. The peasants acquire the love for arboriculture while yet at school. A plot of ground, planted with an assortment of fruit trees, being generally at the disposal of the schoolmaster and his pupils, he will give them lessons on grafting and budding; explain to them the relative merits of the different varieties, and thus implant knowledge into their young minds which generally bears fruit in after-life. On one occasion, I saw half-a-dozen youngsters clambering up a wild cherry tree which had previously been lopped, and under the direction of the long-coated, spectacled, wielder of the rod, they commenced grafting the tree with some new varieties that had been received. If some such system were adopted in the

schools of our agricultural districts, it would diffuse practical knowledge among our rising generation the importance and the results of which could with difficulty be estimated."

The waste land beside our railways amounts to many thousands of acres, since the total length of our great iron roads is computed at 17,000 miles, giving 84,000 miles of bank, and if these only average ten yards in width, the land which this calculation represents is about 200 square miles. Some of this land is well adapted for cultivation, but if only one-third of it were available, it would almost be double the extent of our fruit and vegetable market gardens. If not suitable for apples, pears, and plums, certainly we might plant them with nut bushes, cobs and filberts, or with gooseberry and currant trees, while some of the level tracts might be devoted to vegetables, strawberries, or flowers. Our more thrifty neighbours at least have made a beginning in this way, and surely the almost wholesale waste and misuse of land cannot long continue in this country? Who, indeed, shall say how much capital and labour are annually wasted, melted in the crucible of bad—bad, because useless—public companies, which, if devoted to the work of renting and planting railway embankments and waste land, would prove an ever fertile source of national wealth.

One reason why fruit is not more generally grown in quantity in this country, is owing to technical knowledge being as important an essential to success as capital, and the best results are only obtainable by beginners who possess a tolerably large stock of both ;

hence we find very few persons really able to become commercial gardeners, especially at a time when the accumulated capital and stock-in-trade of two or three generations is scarcely more than is necessary to enable our present trade growers to compete with the enormous imports from other countries, and when capitalists find it more profitable to become middlemen, that is, to lower the profits of the producer under the guise of augmenting trade. This idea in its relation to necessary food products of all kinds is a false one. Individuals may be benefited by forcing trade beyond actual requirements, but for this both the producer and the consumer have to pay just so much as the middlemen or agents receive (or make for themselves), in taking goods from the one and distributing them more or less effectively to the other.

It is, however, no new thing to advocate the planting of fruit trees as a means of improving cultivated and waste land, since this has been done by nearly all the early English authors on gardening, and R. A. Austen, in his quaint and interesting 'Treatise on Fruit Trees,' published about 1653, specially alludes to this method of improving landed property, and also quotes from Blithe's 'The Improver Improved' to show the profits which may thus be realized. After alluding to the then, as now, celebrated orchards of Kent, Worcestershire, and Herefordshire, he remarks: "The common prejudice against fruit trees in fields is that they spoyle grasse, but land not being worth more than 10s. to 13s. 4d. per acre for grasse, by the planting of fruit trees upon it, was afterwards worth 30s. to

40s., or even 50s. per acre, and the fruits upon the trees may yield some 3*l.* to 5*l.*, or some 6*l.* to 8*l.* per acre. In Kent, Essex, Surrey, Middlesex, and those parts, some land that was not worth above 6s. or 8s. the acre, was, by being planted as nurseries of young trees, brought to be worth 20*l.* an acre, and some 40*l.* or more." This is highly interesting information, when we remember that it was written over two centuries ago, at a time when the purchasing power of money was fully double that of the present day.

The average rent of land now in country districts varies from 20s. to 50s. per acre, but near London rents are necessarily much higher, often 5*l.* to 8*l.* per acre, and if planted with established fruit trees when entered on by the tenant, as much as 10*l.* to 15*l.* per acre, or even more is readily obtainable. It is rather difficult to get at the actual profits made by our fruit growers, as the market prices fluctuate very much, even in the same day, and in very productive years, of course, prices are lower than in seasons of scarcity. As an instance of this fact, Mr. F. Dancer, of Chiswick, informs me that in 1875 he had some difficulty in realizing 6s. per sieve for some of his finest late plums, but in 1876 the produce of his early Prince of Wales plum, and the late Belle de Septembre, were readily sold at prices varying from 20s. to 25s. per sieve. Thus it will be seen, that in seasons of comparative scarcity, the grower obtains the utmost value of his produce, and all the expenses of gathering, carriage, and marketing are less, if we except the ten per cent. commission deducted by the salesman; that is,

supposing, as is generally the case, that the grower does not sell his own fruit, but consigns it to one of the fruit salesmen in the market. Mixed plantations of fruit trees give a larger average return per acre than plantations devoted to any special kind of fruit, since not only are the chances of a regular crop increased, but mixed orchards do not exhaust the soil, so soon as when the land is devoted to one particular crop.

As to the proportionate quantities and value of different kinds of fruit produced per acre, we can only arrive at approximate conclusions, since much depends on soil, shelter, and the mode of culture adopted. The following facts kindly given me by Mr. Lovel, of Weaverthorpe, near York, are, however, interesting. Well-grown strawberry plants will produce 1 lb. of fruit each, and if planted in rows 30 inches apart by 15 inches apart in the row, we obtain nearly 3 lb. of fruit from a square yard of ground, and much heavier crops are recorded; but if only 1 lb. of fruit is produced to the square yard, and this is sold at sixpence per lb., we obtain a return of something about 120*l.* per acre. We have, however, evidence of strawberries having given returns nearly as large as this, but on a much more extensive scale, even as far north as Perth, where we learn from the 'North British Agriculturist,' that in 1876 a fruit grower refused an offer of 2800*l.* for the produce of twenty-eight acres of this fruit, and the crop was to have been gathered by the purchaser even at this high price.

On the warm soils of Kent, cherries flourish well,

and a noted grower informs me that he has made 40*l.* on an average for the past ten years from the produce of an orchard of apples and cherries on grass only an acre and a quarter in extent; and from four acres of apples an average crop of 100 bushels of sound, marketable fruit are obtained, and this crop, even at the low price of 5*s.* per bushel, gives a return of 25*l.* per acre, besides the profits derived from the herbage or arable land beneath the trees. One hundred bushels of apples per acre is, however, not a very large crop, since a Devonshire friend informs me that he has gathered over 400 bushels of apples from an acre. In the Home Park, at Windsor, near one of the ranger's lodges, is a handsome tree of the Blenheim pippin apple, which frequently produces from 20 to 30 bushels of splendid fruit.

It is interesting to learn that in Kent—"the land of hops, cherries, and fair women"—certain altitudes above sea level suit some varieties of cherries better than others. For example, the Bigarreau and Duke races flourish best at altitudes varying from 30 to 200 feet, while the black hearts, Kentish, and Turkey hearts grow and produce good crops up to an elevation of 400 feet, beyond which they fail. This is a most important fact, and henceforth elevation must be studied when planting for profit, as well as different soils and suitable stocks.

Good drainage is another important item in successful fruit culture, for if the roots penetrate into deep wet subsoils, it is a noticeable fact that the same sorts of fruit will not keep nearly so long as those

from dry, warm soils, this being no doubt owing to an excessive amount of water in the fruit itself, and to the debility or want of constitution in the trees induced by a cold, damp bottom, which also brings another train of evils, in the shape of insect enemies and lichen growth.

Few fruits are more productive or profitable than cherries in the southern counties, and in Kent, the Bigarreau and Cluster form the largest and most prolific trees, it being no uncommon occurrence to obtain from eighteen to twenty-five sieves of fruit from solitary specimens of these kinds; indeed Mr. Neames of Selling Court has sent to market forty sieves from one tree of the Cluster, a variety which is very popular among the Kentish growers. Now a sieve of cherries weighs about fifty pounds, so that nearly a ton of fruit was in this instance borne by a single tree, while at Milton, a tree of Adam's Crown has borne twenty sieves of splendid fruit.

A very able exposition of the system of fruit culture as practised in Kent, was given by Mr. Webb, in the form of a lecture before the members of the "Institute of Surveyors," on Nov. 25, 1875. In alluding to profits, that gentleman mentioned, that in letting an estate some fourteen years ago, where it was incumbent to make the most of the property, it was decided to reserve the fruit and let the bottoms. There were about ninety acres of mixed fruit, principally cherries, and the fruit was sold by auction when fit to gather. The expenses of sale are not taken off in the following table, but may be taken

at about two per cent. The bottoms are let at about 2*l.* per acre, and an allowance is made to the tenant for a proportion of rates and tithes. The plan of selling fruit by auction on the trees is an easy one for the grower, and on the whole the trees are fairly well taken care of. The cost of gathering and marketing cherries is about 3*s.* per sieve, an increase of about 1*s.* per sieve having taken place within the last twenty-five years. The trees have produced an average profit of 5*s.* 6*d.* per sieve for the last ten years. On the opposite page a return is given of these orchards, together with some others which came under Mr. Webb's notice and management.

I have also to thank the same gentleman for replies to the following questions :

Question. What is the average rental of land in Kent ?

Answer. The average rent of ground here is about 40*s.* per acre; fruit land of course more, varying from 4*l.* to 10*l.* per acre.

Q. What kind of fruit is most profitable ?

A. In this district, cherries, as the soil, elevation, and climate is most suitable to them.

Q. Which is the most profitable kind of orchard culture—on grass, or on land which is cultivated, manured, and under-cropped ?

A. This is rather a difficult question to answer, as so much depends on the style of cultivation. After an orchard is started, say seven years, the cost of labour is trifling, except for gathering the fruit, but an orchard with an under-crop of bush or other fruits

FRUIT CULTURE.

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NAME OF PARISH.	Number of consecutive years the fruit has been sold by Auction.	ACREAGE.			Annual average sale for the years stated in the column 2 of			Total average Sale of Cherries and hard fruit.			Average Returns per acre for years stated.			REMARKS.
		A.	B.	P.	Cherries.	2.	4.	2.	2.	2.	2.	2.	2.	
Lynsted and Teynham	14	88	0	0	1214	0	500	0	1714	0	19	9	6	{ 15 acres of these have not arrived at perfection. Old plantations. The same. This orchard lies low and flat. An old plantation, lies well. { Sold privately together. The same.
Milton	13	29	0	0	350	0	250	0	600	0	20	14	0	
Tunstall and Halstow	13	32	2	0	423	10	148	10	572	0	17	12	0	
Milton	13	10	0	0	69	0	68	0	137	0	13	14	0	
Borden and Tunstall ..	13	2	3	20	88	6	6	4	94	10	94	7	0	
Sittingbourne ..	5	9	0	0	270	0	30	0	0	{ Sold privately together. The same.
Rainham ..	4	7	2	0	..	..	..	..	202	0	27	0	0

has to be pruned, dug, hoed, and constantly manured ; the expense alone of this varies from 6*l.* to 10*l.* the acre, therefore this is a great drawback, nevertheless the returns are good. I, however, give preference to orchard culture on grass.

Q. How many years elapse after planting, before a remunerative return is obtained ?

A. If bush or pyramidal pears on the Quince, or apples on the Paradise or Doucin stocks, be planted with small fruits, &c., as intermediate crops, a good return is obtained in two or three years. Orchard culture seldom proves profitable until eight to ten years after planting ; but, on the other hand, the first cost of orchard planting is about 20*l.* per acre, whereas bush or small fruits will cost at least 9*l.* or 10*l.* per acre to plant, and this brings the first cost of mixed plantations to 30*l.* per acre, besides which, as indirectly shown above, there is a loss of rent tithes, taxes, and labour, during the years which elapse between the time of planting and the appearance of remunerative crops.

One of the most important of all the changes and improvements effected in fruit culture of late years has been, the more general adoption of the Quince stock for pears, Paradise or Doucin for apples, and the Mahaleb stock for cherries. By the use of these stocks we can obtain heavier crops of finer fruit on a given area, in less than half the time that was requisite to obtain anything like a profitable return under the old system of orchard culture.

APPLES.—During the winter of 1875 imported

American apples of the Newtown pippin variety realized 3*l.* per barrel of about two and a half bushels, and the best fruit so imported was retailed at prices varying from threepence to sixpence each. Need we wonder that the orchards on the sunny banks of the Hudson are literally producing gold for their pro-



COX'S ORANGE PIPPIN APPLE (Bush tree, four years old, grafted on the English Paradise stock).

prietors, when prices like these are obtained for their produce, prices in excess of those obtained for even the finest oranges—golden apples of the Hesperides—from Yuba, Florida, Lisbon, or St. Michael. We cannot grow the Newtown pippin apple in this country

to the perfection which it attains in America, but our own Ribstons are scarcely less valuable, the retail prices for the best fruit ranging from 2s. to 6s. per



DUMelow's SEEDLING, OR
WELLINGTON APPLE
(grafted on Nonsuch Paradise
stock, three years old).

dozen; and Blenheim pippin, Cox's Orange, Cornish Gilliflower, and several other kinds are almost as valuable; two or three acres of these fruits on the Paradise or Doucin stocks would be a little fortune to their proprietors. Last year I saw such a plantation belonging to Mr. F. Dancer at Chiswick, these trees being scarcely a yard high—not larger in fact than gooseberry bushes—being only two years from the graft, and yet they bore from six to eighteen fruits each, and nearly every fruit of the largest size and most beautiful colour. The variety in this case was Cox's Orange pippin, but in Messrs. Veitch's Coombe Wood Nursery I saw similar specimens of the true Ribston, each bearing from one to two shillings' worth of fine fruit. An acre of such little trees would produce from 20*l.* to 30*l.* worth of fruit at three years from grafting, and intermediate crops of strawberries might also be obtained by the liberal use of fertilizers.

THE PEAR is a less useful fruit than the apple,

because as a rule its varieties must be eaten or sold, as soon as they are ripe; another disadvantage, and one almost peculiar to this fruit, since plums and bush fruit can be preserved in sugar or syrup and afterwards sold to advantage, is, that if they cannot be marketed in a fresh state with convenience and profit, they are, comparatively speaking, lost. Of course either perry or conserves can be made from pears, but there is as yet, except here and there, no great demand for these products. It may be as well to note, *en passant*, however, that canned or bottled fruits of the Bartlett variety, (the "Williams" of our costermongers' street barrows, and the Williams, Bon Chrétien of European gardens) now find a market in this country, considerable quantities being sent from the American fruit farms.

Bush culture of the pear on the quince is the most convenient, and this system produces the best returns from a given area. This is the plan of culture now adopted on the Continent, and especially in the Channel Islands, whence we receive some of our finest fruits, including the enormous examples (each weighing from 2 lb. to 5 lb.) of Belle Angevine (or Uvelale's



BEURRE CLAIRGEAU PEAR
(grafted on the Quince stock).

St. Germain), which are marked up in the principal fruiterers' shops about Christmas time, at the fancy prices of two to three guineas each; they are, however, worthless to eat unless baked, and are merely set in the windows for show. Really good fruits of such varieties as Jargonelle, Williams, Bon Chrétien, Marie Louise, Doyenné du Comice, Fondant d'Automne, Duchesse d'Angoulême, Easter Beurré, and others, obtain a ready sale at from two to three shillings per dozen fruits, and they are retailed at double that price.

Really fine fruit of the late-keeping varieties pay remarkably well, but it is only on deep, rich, dry-bottomed soils that good late-keeping pears can be grown. In the Royal Horticultural Society's garden at Chiswick, all the best late kinds of pears are grown and attain a good size, but they do not keep well; and this is found to be the case throughout the Thames valley, except in a few gardens where the land is well drained. The selection of a suitable soil and locality is a most important point, where late-keeping fruits of any kind are desired. Nearly all our finer kinds of pears are of Belgian origin. In Covent Garden Market certain pears, such as Jargonelle, Williams, Bon Chrétien, Duchesse d'Angoulême, Beurré d'Arenberg, Easter Beurré, and one or two others, form the principal supply, not necessarily because they are of better quality than many others, but because they are well-known both to the dealers and their customers. All growers for market experience great difficulty in selling new sorts of fruit, however good in quality they may be, because dealers are reluctant to buy

comparatively unknown sorts when popular varieties can be had. Late pears, such as ripen from October to March, pay best.

Mr. Francis Rivers tells me that he recently saw thirty miles of railway embankments in Belgium, devoted to the culture of pear trees on cordons, a system by which a large amount of fruit may be obtained from a limited area, and owing to the low stature of the trees, they are easily protected when in bloom in spring. As material on which to train the branches he recommends oak posts, formed of old ship's timber, through which two galvanized wires are stretched. By taking out a trench on each side of the rows, and filling this annually in the spring with fresh soil, and thoroughly rotten manure, fruit equal to that produced in Jersey, on bush trees, may be obtained. He also remarked, that in 1873 he planted fifty Duchesse d'Angoulême pears grafted on the quince, and in 1875, each of them produced, on an average, ten fine fruits, the wholesale value of each of which is about four pence. At six feet apart each way an acre would contain 1210 trees, the produce of which would be worth upwards of 200*l.* annually; but, of course, cost of trees, rent, labour, and other working expenses, must be taken into consideration.

THE PLUM.—This is one of our most useful hardy fruits, and one which is well suited for small gardens, especially such as are sheltered from winds and biting spring frosts. Many orchards in Kent are planted entirely with this fruit, and yield good returns. Mr. Webb tells us that a plantation of greengages at

Gillingham, in which the trees are six or seven yards apart, is a model of a perfect fruit garden, and have yielded a return of more than 100*l.* per acre. The owner was offered 50*l.* an acre for the fruit on the whole area of twenty-eight acres, half of which was not nearly so valuable as the greengage part. The most perfect plum orchards I have seen are those of Messrs. Rivers and Son, at Sawbridgeworth, and that of Mr. F. Dancer, at Chiswick, where from July to October, such sorts as Early Rivers, Poupert's Purple Gage, Belle de Septembre, and other standard market varieties, may be seen in perfection. In 1876 Mr. Dancer sold his Belle de Septembre plums readily at 26*s.* per bushel, and Early Rivers at about the same price.

Damsons are a profitable crop on good soils, and from 8*s.* to 10*s.* per bushel are easily obtained for them. The best sorts of damson are Strood Cluster, Frogmore, and Shropshire. Mr. Charles Roach Smith* speaks very highly of the Strood Cluster, the amazing fecundity of which "will tend to revolutionize the damson kingdom." The original tree stands in the garden of Mr. Herbert, of Strood, Kent, who says it is always worth a pound a year to him. An acre of damsons of the Strood Cluster, Frogmore, and German prune varieties, planted six or seven yards apart, would require about a hundred trees, and these at the lowest estimate would bear a bushel of fruit each, but more likely two or three when fully grown, and the lowest value of this would be 50*l.*, besides which the ground

* 'On the Scarcity of Home-grown Fruits,' p. 14. London: J. B. Smith, 36, Soho Square.

would be intercropped with wallflowers, daffodils, tea roses, herbs, or vegetables. An acre so planted would be a little fortune to a gardener who had other occupation until his trees came into bearing.

The best plums to grow for profit are Early Rivers, Victoria, Syston, Jefferson, Belle de Septembre, Prince of Wales, Greengage, Quetsche or German prune (old trees of which, like the damson, may be headed back with advantage), Prince Engelbert, Pond's Seedling, and Early Orleans. For a wall, Transparent Gage, Reine Claude de Bavay, Jefferson, Coe's Golden Drop, Coe's Late Red, and Goliath. We have yet plenty of room for improvement in plum culture, since it is one of the best of all fruits for preserves, and the French and Belgian cultivators, taking advantage of this fact, have developed prune culture into a by no means inconsiderable national industry.

All the finer kinds of plums are grafted on seedling plum or damascene stocks, and we have yet to learn which of the many varieties of plum now employed as stocks is best suited to the particular races. In Nebraska, and other North American States, wild plums abound plentifully in the thickets, and fruit freely, and as these are self propagated from stones, a large number of naturally cross-fertilized varieties are found, some being of superior excellence.

There are three species or types of these wildings, namely, *P. Americana*, *P. Chicasa*, and *P. Pumila*, all of which possess peculiar merits, and deserve introduction into our gardens, if only as hardy stocks on which to graft our more tender seedlings, and espe-

cially is this desirable, since American fruit-growers find them "good stocks for plums and peaches, as well as apricots." Throughout Northern Asia again, there are many types of plums, as well as apples, pears, and cherries, which, if introduced into our gardens, might prove of immense value to the hybridists for cross fertilizing our own cultural varieties, or as stocks. The "keeping of plummies" occupied much attention from some of the earliest English writers on gardening, and there is still room for progress in this direction, especially as one variety, "Coe's Late Red," may be had in perfection at Christmas, and "Coe's Golden Drop" even later. Lindley in his 'Orchard and Kitchen Garden,' tells us that, wrapped in soft paper, and put away in a dry place, the fruit of this variety has been preserved for nearly a year after it was gathered.

THE CHERRY.—This is one of the most delicious and refreshing of all our summer fruits, and when systematically cultivated, it forms one of the most remunerative of all fruit crops. In East Kent, cherry orchards have been established for centuries, and at the present time the cherry is peculiarly a Kentish fruit, since soil and climate there seem alike suitable to its growth. The principal point as regards cherry culture is, as Mr. Webb informs us, a dry subsoil; they will not do in the clays; neither do they like cultivation for any length of time, and although the trees will attain a good size, and bear at times tolerably well, they do best on grass, and when their roots are undisturbed. Plantations of cherries are

most frequently raised on cultivated land, with a crop of under-fruit, and the trees in this way make wood very fast. After eight or ten years, however, the land should be laid down to grass. A good climate is indispensable for cherries, especially such sorts as the Bigarreau and the Duke tribe. These sorts flourish best at an elevation of from 30 to 200 feet above sea level; Black Heart, Kentish, and Turkey Hearts do fairly well up to 400 feet; but at any elevation beyond that, the chance of a crop is precarious, and the fruit indifferent.

It is odd, that although our great propagators have added of late years so many excellent and useful varieties to the stock of apples, pears, and plums, yet with cherries we have had but few additions. The old recognized sorts continue to hold a prominent place in all fresh plantings. We much require a few good early sorts to compete with the foreigner; but what new sorts we have must be proved before we know their standard qualities. For all useful purposes, I should recommend for orchards, Early Purple Gean, Adam's Crown, Frogmore Bigarreau, May Duke, Governor Wood, Cleveland Bigarreau, Elton Heart, Knight's Early Black, Old Black Heart, Waterloo, Bigarreau, Mammoth, Mary, Black Tartarian, Black Eagle, Flemish, Turkey Heart, Florence, Kentish, Cluster, and Morello. The above will ripen in the order in which they are placed. The Bigarreau and Cluster make the largest trees; indeed, the latter might be planted as an ornamental tree in any park.

In planting, the cherries are set ten or twelve yards

apart, with a plum tree as an intermediate plant. The plum is selected, as the tree rarely lasts longer than the time required by the cherries to develop themselves, and they are then cut away. The above distance gives about eighty trees to the acre, and, as I have shown elsewhere, the produce of a single cherry tree is often as much as eighteen to twenty sieves of saleable fruit, the market price varying according to the variety, from 10*s.* to 15*s.* or even as much as 21*s.* per sieve. It was formerly the custom in Kent to sell the cherries in orchards or plots by auction, the buyer gathering and marketing the fruit, and although this practice is still followed in many places, some of the more intelligent fruit growers find that it pays better to gather and market their fruit themselves, their trees in this way being less injured, and a very much better price obtained for the produce. The cost of picking and marketing cherries is about 3*s.* per sieve, and of this sum about 15*d.* goes for picking, and 14*d.* for carriage and marketing expenses. The additional 7*d.* is expended in sieves, ladders, and other necessary appliances. The late-keeping sub-acid Morello cherry is generally grown on north walls, its fruit being chiefly used in preserves and in the manufacture of cherry brandy.

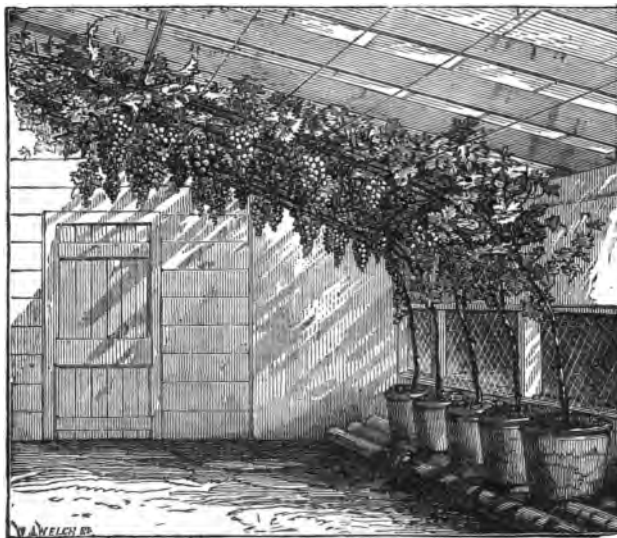
In most gardens the cherry season begins in May, and ends at the beginning of August, but there is no reason why it should, inasmuch as cherries may be had in perfection until October or even November. At Frogmore, Late Dukes and Napoleon Bigarreau are ripe in October, and at Chiswick several of the

best late varieties are then in excellent condition, at which latter period I have seen fine fruit of the following varieties at Frogmore, Chiswick, and elsewhere, viz. Napoleon, Late Duke, Bigarreau de Hildesheim, Bütner's October, Coe's Late, Carnation, Downer's Late Red, Florence, Belle de Septembre, and Late Bigarreau. Careful shading with tiffany or canvas blinds is necessary to keep off wasps and birds. North walls in our gardens could not well be made better use of than by being covered with the finest varieties of late dessert cherries, as well as with Morellos, as is now generally the case. The wild cherries of America and Northern Europe well deserve introduction to our gardens for cross-fertilizing purposes.

THE GRAPE VINE.—This is one of our most valuable fruits, and one, which under hot-house culture, has attained greater perfection in our northern gardens than elsewhere. The grape-producing industry of our Thomsons, Coles, and Sages, may be set down as among the most remarkable evidences of skilful fruit culture in this country. Speechley, when gardener at Welbeck many years ago, produced a cluster of the white Syrian grape weighing about 20 lb. Quite recently, too, a cluster of black Hamburgh was exhibited at Edinburgh weighing 21 lb. 12 oz., and bunches of the Syrian and white Nice weighing upwards of 26 lb. each. Bunches of the Gros Guillaume grape frequently attain from 10 to 13 lb., but apart from these immense clusters, the general culture of grape crops under glass throughout the

country has been much improved within the past thirty years; indeed a vinery has now become an almost necessary adjunct to the residence of most business men, and also to that of not a few artisans.

The earliest grapes obtainable during the spring months are as a rule the produce of one or two year old vines from cuttings grown in pots, as shown in



POT VINE CULTURE AT SAWBRIDGEWORTH.

the annexed engraving, which represents a successful mode of culture adopted by Mr. F. Rivers, of Sawbridge worth, the necessary amount of bottom heat being obtained by placing the pots in which the vines are grown on the surface of the hot-water pipes.

Grape growing for market is now a remunerative industry, and perhaps no market grower has been more successful, or has produced upon the whole finer fruit than Mr. W. Thomson, of the vineyard at Clovenfords, near Galashiels. The essentials on which Mr. Thomson relies in order to secure his, in some respects, unrivalled crops, are light houses amply provided with heating, ventilating, and watering apparatus, fresh, turfy soil from upland pastures, in which vine roots delight, the occasional use of bone-dust and guano as manures, and careful management in regulating the climate, and in pruning and dressing the vines. I visited this vineyard, which is wholly under glass, in September, 1875, and found several tons of splendid fruit either ripe or ripening. Against a corridor, 148 feet in length and 26 feet in width, are set at right angles three span-roofed houses, each 200 feet long and 24 feet wide. All the ventilation of these is worked from the corridor. The top is lifted by means of Baird's patent wheel and screw system. The front sashes are hung in the centre, attached to a rod with bars, and are lifted and shut, all at once, from end to end, by means of a simple mechanical arrangement. The whole of these structures are supported on strong stone blocks, with openings between, giving the roots free access to the outside borders, which are 30 feet in width. Four thousand six hundred feet of 4-inch piping are employed to convey heat to these four houses. This amount of piping at first was heated entirely by one boiler 18 feet long, in shape like one of the old

Cornish tubular boilers, having a skin of water two inches thick all round the fire. In case of accidents however, another smaller one of the same form was subsequently attached, and is now worked when required. One side of the above corridor is wholly planted with the Duke of Buccleuch variety of grape; each stem has two rods trained in the form of the letter V. The others are Black Hamburgh, Duchess of Buccleuch, Grizzly, and White Frontignan, Royal Muscadine, Madresfield Court, and Golden Champion. This house, which is the earliest, produces ripe fruit about the beginning of July, when the produce is mostly sold on the place to visitors, who frequent it in great numbers. The other houses are planted with Lady Downes, Gros Colman, Alicant, and Muscats respectively, and bear very heavy crops. Another house, 200 feet long and 24 feet wide, with 2400 feet of piping, stands apart from the principal range on a slight eminence, and is mainly planted with Lady Downes, and here and there an Alicante. Another smaller vinery, 70 feet long and 15 feet wide, stands near this, and is exclusively for Lady Downes, the fruit annually hanging in it to April. A good supply of water is obtained from a reservoir at a considerable elevation above the vineyard, the water being supplied to each house by means of smaller pipes, which are coiled round the side of the expansion tanks, and thus becomes slightly warmed before being used for cultural purposes. Indiarubber hoses are attached to each pipe, by means of which the borders are watered, and the vines syringed in any part of the house when-

ever necessary. The fruit from this establishment is regularly sent to Covent Garden, and other large fruit markets, tightly packed in flat baskets, which fit into stout cases; these leave Clovenfords at night, and the next morning the fruit may be bought in London as fresh as if but just cut from the vines.

The open-air culture of the grape is successful in many sheltered localities on warm calcareous or gravelly soils, and within the last few years the Marquis of Bute has established an open-air vineyard under the French system of culture at Castle Coch, from which successful results are expected. If ever the open-air culture of the grape is to become of any national importance, however, we must look to the hardier varieties of the American vines, or hybrids between them and the Asiatic species (*Vitis vinifera*) now grown throughout Europe, before we can hope for success on a large scale. I have eaten perfectly ripe Black Cluster, Esperione, and Royal Muscadine grapes from sunny walls at South Kensington and Brompton, and at Heckfield Place, the seat of Viscount Eversley; the Muscadine or Chasselas ripens, as a rule, perfectly; even in the midland counties the little Black Cluster grape ripens well in hot summers, and in an old-fashioned garden at Melton—a fox-hunting centre—fruit of this variety is produced by the hundredweight on an old mud wall, and from which some really excellent wine is made. A recent writer on open-air grape culture in the 'Garden,' says: "If the same pains and skill were bestowed upon the culture of grape vine in the open air as when it is

grown under glass, a vast improvement would soon take place in its produce. Almost any soil that will grow good crops of vegetables will produce good open-air grapes. But the vine, like the ivy, seems to have a partiality for old crumbling ruins. Some of the finest open-air grapes I have ever seen were grown some years ago upon the remains of the old city wall at Norwich; the site was dry and warm, and the soil rich from the accumulations and decompositions of ages. Where the soil is fairly good, trench it up two feet deep and six feet square for each plant; as they increase in size, more space can be prepared for them. It will be an advantage if a few barrowfuls of horse-droppings, fresh loam, lime débris from old buildings, and a few bones can be worked in at the same time. There is hardly a possibility of making a mistake in adding a reasonable quantity of any of the materials just enumerated, as they are calculated to improve even the best soils as far as their adaptation to grape culture is concerned. If the site be damp and resting on clay, put in the bottom nine inches of brick rubbish or stones, scatter a few spadefuls of lime and coal ashes over the top, water it, and ram it down firmly; on this foundation place the soil and plant the young vine.

PEACHES AND NECTARINES.—These are grown for market in considerable quantities by some fruit growers, the early fruit being obtained from trees grown either in forcing houses or on sunny walls covered with a glass framework, by which means larger and more perfect fruits are obtainable than could be produced otherwise. Early peaches and nectarines of home growth

realize from 3s. to as much as 10s. per dozen, if of good quality, but inferior fruit has been of late years scarcely marketable since such keen competition has been excited by the Channel Island and Continental growers. Large and handsome fruit is however always sure to meet with a brisk sale. The bulk of the fruit grown in this country comes from open walls in the southern counties, and in favourable seasons immense crops are thus obtained. The essentials, as regards good open-air peach culture, are friable well-drained soils, and shelter or protection from spring frosts. The pruning of peach and nectarine trees also requires a considerable amount of care and skill. The varieties generally grown for profit are Peaches: Royal George, Noblesse, Early Louise, Barrington, Bellegarde, Early Crawford, Salwey, and Walburton Admirable. Nectarines: Victoria, Pine Apple, Elruge, Violette Hâtive, and one or two others. The hot-house culture of these fruits alone would scarcely be profitable, but the growers augment their profits by the culture of mushrooms, mustard and cress, cut flowers, tomatoes, or early strawberries in the same structures, and thus peach and nectarine growing becomes remunerative.

FILBERTS AND COB NUTS.—Kentish gardens are almost as famous for filberts as for cherries and other fruits, and scarcely any other fruit crop is more profitable, since the labour necessary after planting is very small, and the trees increase in productiveness as they acquire age. Another advantage possessed by these nut bushes is that they may be used as undergrowth, planted rather thickly between standard

or even bush trees of apples, pears, cherries, or plums; and, like the common hazel nut of our woods, they seem to enjoy the partial shade and shelter, the quantity of fruit produced being even greater than when they occupy a plot to themselves and are more fully exposed. The best varieties for profitable culture are the red and white Kentish cob nuts, Lambert filberts, Costard, Prolific cob, Webb's Prize cob, and a large free-bearing French variety, viz. *Merveille de Bolwyller*. Propagation is effected by layering, and new varieties are raised from seed. All the finer varieties make a free and prolific growth when grafted on the Spanish hazel nut as a stock, and suckers are not so troublesome as when layered plants are employed.

The best trees for planting are such as have been raised by layering the shoots, and have been planted out, in rows or otherwise, for two or three years, in order that they may obtain strength and form. At their final planting, they are generally arranged in a plantation of several lines, the trees being from nine to twelve feet apart each way. The time for planting out is the autumn. Each tree is pruned so as to have an upright stem from three to four feet in length, in order to allow the production of a suitable head. In the spring time the upright stem is cut down to about two feet; when the shoots push, about six or eight of the best placed are retained to form the head, and all others rubbed off. None are kept at the lower part of the stem, but about a foot of clear stem remains. This is afterwards kept free from any shoots. The

shoots which are designed to form the head are regulated as they make growth, so as to have them equidistant; this is best managed by using a hoop placed over the tree, the shoots being tied out to it at the places required. Their ends are allowed to grow upwards; but in each season, care is taken to keep open the centre of the tree, no branch being allowed to grow thereon, so that the tree is formed similar in shape to a basin. The branches are allowed to grow in this position to the height of five or six feet, and at that altitude they are afterwards kept. In the act of pruning the trees, the short spurs which are produced on the branches are always retained and encouraged. All lateral shoots that exceed half a foot in length are cut back to about four inches long; if about half a foot, they are left untouched, as their ends are generally fruitful. I feel convinced that filberts and cob nuts would be the most remunerative crop that could be grown on railway embankments, and an enormous return might thus be obtained from thousands of acres now lying waste; indeed, filberts and cob nuts may be planted on the outskirts of orchards, by ditch sides, or at intervals in hawthorn fences, with good results.

Mr. Webb, of Calcot, near Reading, an extensive and successful grower of filberts, has kindly supplied me with the following interesting particulars:

Mr. Webb's speciality is nut culture, though, beyond planting and sowing, there is indeed little "culture." One tree is 50 feet through, but a large plantation of cob filberts is so crowded, that they can hence-

forward only grow upwards. Beneath are violets, or polyanthuses, or grass, and the large nuts bear year by year without attention, pruning, or digging. The crop is shaken off at the proper season, and then gathered from the ground. We have heard of the easy life of the South Sea Islanders, whose wants are so well supplied by the abundant fruit that they have only to eat and amuse themselves, but it is doubtful if they get such a good return, as these Astrachan apples and Blenheims and Ribstons and large nuts yield in cloudy England. The time saved from the pruning and other attentions usually supposed to be necessary, the owner devotes to the selection and rearing of seedlings, and he is already known as the chief of improvers of our large cob and filbert nuts, having raised, among others, Webb's Prize cob filbert, the Emperor cob, Improved Cosford cob, Daviana cob, Eugenie, Princess Royal, Garibaldi, the Duke of Edinburgh, the Shah, Miss Beckwith, Miss Parker, and Lady Yelverton.

In consequence of the extraordinary demand for, and high price of, cob filberts, says Mr. Webb, I have for some few years been a grower of them, and in 1855, I planted all the ground I had (*viz.* 10 acres) with them, and which are now all in a bearing state. I have put my trees in squares, 8 feet 3 inches apart, and therefore it takes six hundred and forty trees to plant an acre; as my trees were getting to a good size, I planted potatoes between them, and have had good crops on the same ground for seven successive years, and have only manured once since the first

planting, and over these I have apple, pear, and plum trees, all in bearing order.

Now, with regard to the nuts and their produce:— If the six hundred and forty trees bear 1s. each, it is 32*l.* per acre per annum, and if they should bear 10s. each tree, it would be the almost fabulous sum of 320*l.* per acre, and it is not too much to suppose they will yield even more than that, for as a proof of it I have gathered off one tree 110 lb. of cob nuts; and then look at the price obtained at the market—always saleable—if not as soon as gathered, they may be kept for months, and they are sure bearers six years out of seven. The main reason why filberts do not bear such heavy crops as other nuts is, because they are deficient in pollen, and to remedy this a few hazel nuts and prolific cob nuts should be planted among them. I am of opinion that no crop can be planted which will yield so much money per acre. Let any man purchase twenty acres of land (for it should be freehold) at 100*l.* per acre, and plant it with cob filberts; in seven years it will be worth 1000*l.* a year to rent—to purchase, ten times the cost. Being certain of the correctness of this statement, I have planted all the ground I have. Another thing is, that these trees will grow on every soil, so that much of the waste land about Chobham and its neighbourhood would be a very profitable investment to purchase and plant.

I promised to give a more detailed account of the produce of an acre. First, then, cob filberts are the foundation of the produce. Early in September we com-

menced gathering, and from half an acre of ground we had 1300 lb. of cob filberts, and upon another three-quarters of an acre 1700 lb., besides apples, pears, and potatoes. The value of the produce upon the half acre was as follows:

	£	s.	d.
1300 lb. cob filberts, sold at 7 <i>l.</i> per 100 lb.	91	0	0
40 bushels of apples	20	0	0
Potatoes	7	10	0
	<hr/>		
	£118	10	0

Now this gives 237*l.* per acre. Again, the 1700 lb. on three-quarters of an acre of cob filberts actually sold at 7*l.* per 100 lb. and some at 7*l.* 10*s.* will be, if we calculate them at

	£	s.	d.
7 <i>l.</i> per 100 lb.	119	0	0
50 bushels of apples	35	0	0
20 " pears			
Potatoes	5	0	0
	<hr/>		
	£159	0	0

	£	s.	d.
Add one quarter more for the remaining quarter of an acre	39	15	0
Return per acre ..	£198	15	0

I think, therefore, after many years' experience, I am fully justified in stating that from 200*l.* to 300*l.* per acre may be obtained in growing cob filberts and other nuts of the best quality. Now this is not a plantation that no one can see, for we have numbers

of welcome visitors, and I may say from all parts of England, Scotland, and Wales, who can testify in some measure to the grand produce of my fruit garden.

It is but right to add that Mr. Webb has been most fortunate in his selection of a fertile plot of land possessing a genial climate, because well sheltered; and the figures above given, although strictly accurate, would be far too high for less favoured localities.

BUSH OR SMALL FRUITS deserve notice here, as they can be grown in the smallest of gardens, and their propagation and culture is of the easiest possible kind. Mr. C. Roach Smith says that gooseberries and currants "grow almost spontaneously, and are so profitable, that a gentleman in Kent paid his rent yearly from the fruits of his currant trees alone." Gooseberry and currant trees may be obtained in any quantity by inserting cuttings of the young wood, pieces a foot or more in length, in a north border in November, or they may be bought cheaply in any nursery. A few acres of black currants would prove a profitable investment to any small landed proprietor, or market gardener; indeed one of our large fruit-preserving houses now devotes some twenty or thirty acres to this crop, for the produce of which there is always a ready market at 10s. to 15s. per sieve.

After the black currant the Warrington gooseberry is perhaps the most profitable, since it is preferred to nearly all others for preserving. Gooseberry trees may be planted four feet apart, currants eight feet, seeing that the soil is well drained, trenched, and manured. All the after culture actually required is

mulching in winter with rotten manure, before which the trees should be slightly thinned or pruned.

The profits of bush fruit vary. Black currants in a good season are worth from 50*l.* to 70*l.* per acre, but, taking gooseberries and currants together, they will average 30*l.* per acre year by year, and in most market gardens, the returns are augmented by the culture of fragrant flowers and herbs as intermediate crops.

Raspberries are not much grown for market, as they do not bear carriage well; they are, however, profitable, if a local market is obtainable. The American cultivated varieties of the blackberry, *Rubus fruticosus*, and *R. laciniatus*, deserve more extended culture, especially in private gardens. In boggy meadows, where the soil is peaty, cranberries may be cultivated with success, and, notwithstanding the importation of canned produce from America, would doubtless prove a remunerative crop, seeing that such land is obtainable at a cheap rate, either to rent or purchase.

Strawberry culture is a lucrative industry on almost all soils, if we except cold clays in exposed situations. The London market is principally supplied from the market gardens of Kent, Surrey, Middlesex, Hertfordshire, and Bedfordshire, while early fruit is now sent from French market gardens, and also from the Channel Islands. The earliest fruit is obtained from plants grown in pots and forced in a heated pit or vinery, on shelves near the glass. The season for forced fruit begins in February and March, when good fruit is worth from 6*d.* to 2*s.* per ounce. Mr. Bennett of Rabley, who forces large quantities of strawberries for market, tells me that some of his plants produce nearly half a pound

of fruit each, and some even more. In the royal gardens at Frogmore, about 9000 pots of strawberries are forced every year, and from two to three acres of this fruit alone are grown in the kitchen gardens, and I am informed by the royal gardener that the downy leaved varieties do not succeed so well as the smooth leaved sorts.

Two of the earliest and best strawberries are *Le Gros Sucré*, and *Prince of Wales*. *President Lucas* and *Sir Charles Napier* are other excellent kinds for forcing. One of the finest of all the sorts now grown is *James Veitch*, of which variety four fruits gathered at Frogmore weighed one pound, while fruits two ounces each are quite common. Such sorts as *Keen's Seedling*, *Princess Alice*, and *Refresher*, are very early, of good quality, and robust growers. For mid season you may select *President*, the *Amateur*, *Sir J. Paxton*, *Ne Plus Ultra*, *Le Constant*, and *Sir Charles Napier*. Four good late varieties are, *Dr. Hogg*, *British Queen*, *Filbert Pine*, and *Elton Pine*. The *Alpine strawberry*, or *Frasier Quatre Saison*, or "*Tout les Mois*," of the French, ought to be grown more extensively in our gardens. I have eaten fine fruit in French gardens late in August, and possibly we might obtain fruit still later in our climate. The ever-bearing *Andean strawberry* is a variety nearly related to the last, and is cultivated pretty generally throughout the Andes within the tropics. In the province of *Ambato* they fruit all the year round at an elevation of 7000 to 9500 feet above sea level; where the mean temperature ranges between 59° and 67°.

A writer in the '*North British Agriculturist*' re-

marks that the strawberry growing in the field has now become an important industry in some parts of Scotland. They require a great deal of labour, but otherwise they are not an expensive crop. The original cost of planting an acre does not exceed 20*l.*, and the plants will remain perfectly good for several years. In 1876 we heard of a farmer near Coupar-Angus netting 400*l.* for three acres of thin land under strawberries. The plants on which these grew were four years old. Another farmer near Perth refused 2800*l.* for the crop of twenty-eight acres of strawberries, and the purchaser was to have pulled the crop, which was a splendid one. If anything like 100*l.* can be got for the produce of one acre, we doubt not many farmers will put considerable portions of their sharp, thin land under this crop. There is no other way it can pay so well. Sixpence to one shilling per pound is readily obtainable for fresh strawberries even in July, and strawberry preserve, if good, commands a ready sale at remunerative prices.

The culture of strawberries may be made a payable occupation, even in a northern district where land is rented at 5*l.* or 6*l.* an acre, and where manure is valued at 8*s.* per load. Mr. Lovel of Weaverthorpe, near York, has a little farm devoted to this crop, and his practice may be summed up in a few words. Runners are taken from first year plants, and from those only which are most fruitful; these, after they are rooted, are removed to a well-manured nursery bed, where they are watered and shaded, and from whence they are transplanted in the autumn. Thus treated, they

bear crops of fine fruit the first season. The following concise rules are recommended as safe guides for strawberry growers to follow :

1. Avoid planting strawberries continuously on the same land as much as possible. A rotation of crops is sound practice.

2. Give the land deep cultivation previous to planting. Two spits deep is better than one ; but subsoil, do not trench.

3. Give the land plenty of manure both before and after planting (the latter in the form of mulchings), and thus enable it to retain a supply of moisture during dry weather.

Under this system of culture, upwards of 1 lb. of fruit per plant, which is nearly 3 lb. of fruit per square yard, has been grown. A celebrated strawberry grower last year said that his plants of British Queen had produced eight quarts of fruit per plant, and eight quarts of fruit weigh 12 lb. But let us be more moderate, and say a crop of strawberries will produce 1 lb. of fruit per square yard ; and if we charge 6*d.* per pound for the fruit, the very handsome sum of 120*l.* per acre will be realized, a sum that will pay for cultivation and manure, and all other expenses, and still leave a good profit. On deep, rich land, strawberries will grow from year to year without removal. I have found it a good practice, when I wish to replant the same land, to dig the land over as soon as possible, and not plant till the spring following, and if the plants be small, not to let them bear the first season after planting. Planted 30 inches apart, and 15 inches

in the row, they will thus make splendid plants, and bear an excellent crop.

The treatment for the second and third year is as follows, viz: To take every other plant out of the row on the second or third year, to keep the land clear of weeds by hoeing, to keep the plants free from runners, by taking them off as fast as they appear; to give the plants a mulching of manure in the spring, and to give the land a coat of clean straw as soon as the plants burst into bloom. You will secure abundant crops of strawberries for three years by this treatment, if you make a good selection of varieties in the first instance. Strawberry growing on this plan might be tried in small gardens and allotments with advantage; and we have hundreds of acres of warm, sunny, railway embankments, which might, with but little trouble or expense, be converted into strawberry gardens. In this way, tons of this fine fruit might be produced on land which is now lying wholly waste.

VEGETABLE CULTURE.

THE cultivation of vegetables is now a most important industry, especially in the immediate vicinity of all large towns, where this branch of culture is found to be one of the most profitable methods of utilizing land. As a national industry, our vegetable culture dates back a little more than two centuries, at which time it was the custom, as at present, to import salads and other vegetables from the Low Countries. Fuller, indeed, shows us the beginnings of market gardening rather more than two hundred years ago; he wrote in 1662, "Since gardening hath crept out of Holland to Sandwich, in Kent, and thence into this county (Surrey), where, though they have given 6*l.* an acre and upwards, they have made their rent, lived comfortably, and set many people on work." A large proportionate area of the land within a radius of ten miles of London and many other large towns is devoted to vegetable culture, and large supplies are also sent to the metropolitan markets from Kent, Sussex, Berks, Bedfordshire, Essex, and other counties, while immense quantities of early potatoes, and winter and spring brocoli are grown in Cornwall. Cheap and rapid transit has enabled cultivators in France, Belgium, and the Channel Islands to compete with our own growers, and the extra supply derived from Continental sources is supplemented by yearly increasing con-

signments of dried and canned or tin produce from America.

During the last thirty years, the quantity of vegetables eaten by all classes of society has largely increased, apart from the additional supply rendered necessary by the actual increase of population, although the latter cause of consumption alone must have had considerable influence on the production of both fruits and vegetables. That this enormous increase of population also accounts in a great measure for the ever increasing imports of grain, potatoes, fruit, meat, and other food products, is shown by the following returns of the Census Commissioners, who, in their final report, state that the towns in England and Wales stood thus at the three censuses of 1851-61-71 :

	1851.	1861.	1871.
Number of towns ..	580	781	938
Area in acres	1,724,406	1,913,945	2,213,421
Population.. ..	8,990,809	10,960,998	14,041,404

That our imports of vegetables, fruits, &c., are so large, is ample proof that much more land and capital might be devoted to these branches of culture with advantage, were it not that most of our own fruit and vegetable growers are heavily rented, while on the other hand their continental competitors are, as a rule, small landed proprietors, whose interest it is to cultivate their own land in the best possible manner. Our own land laws are fatal to the best systems of earth culture, since they stifle that spirit of independence which is a necessary part of all the noblest kinds of labour, and this is especially true of food-pro-

ducing labour or earth culture. Mr. Mechi, in one of his papers, says, we must "rescue land from its feudal swaddling clothes, and give it a modern suit adapted to modern requirements. Let the old customs and difficulties of sale, purchase, transfer or devise go with the old tinder box and matches, the old watchman, and the old slow coaches. The existence of vast areas of uncultivated waste, and the impossibility of selling or purchasing land quickly, cheaply, and safely, cannot long continue in the face of a hungry and wealthy population of thirty-two millions!"

The total area given in the agriculture returns for Great Britain as being devoted to the growth of vegetables and other market garden produce is only 38,957 acres, an area so small in proportion to our population, that we need no longer wonder at the increase of our imports, even after making due allowance for the vegetables grown by the consumer on land included under other heads in the statistical returns. When we have but a little more than 1000 acres of land to the million inhabitants devoted to the vegetable-growing-for-sale industry, we need no longer evince surprise to find that we import fruit (minus nuts) to the value of 5,000,000*l.*; the total value of imported potatoes, to say nothing of other miscellaneous vegetable produce, being considerably over 1,000,000*l.* sterling. Market gardening or vegetable culture as at present conducted consists mainly in ample drainage, deep and frequent cultivation, or stirring of the soil, so as to present as many of its absorbent particles as possible to the full action of sun and air. The object

of this being to keep the earth in an absorbent condition permeable alike to water and manurial gases, heat and root growth and the constituent chemical elements of the soil actually removed in the shape of vegetable products are restored by copious supplies of soluble animal, vegetable, and mineral manures of various kinds. Even land which appears to be exhausted or sickened by any particular crop may be renovated by the application of lime dressings, manure, and deep cultivation during winter. Market gardens are extremely variable in extent, say from one to several hundred acres. In many of these, fruit and vegetable growing is combined, the *sine quâ non* in this case being additional labour and a more copious supply of manure.

It will be seen that vegetable growing, if well carried out, is more remunerative than fruit culture, since three or four or even more crops are obtainable during the year from the same ground, whereas only one crop of fruit is possible, and an unfavourable spring may destroy all hopes even of that. Vegetable growing, however, requires a larger labour and capital account than fruit culture, notwithstanding that the returns are much quicker, since a fruit plantation, when well planted and once into bearing, requires but little labour to keep it in a flourishing and productive state, and for this reason this branch of industry is best suited for small holders of landed property who wish to cultivate it to the best advantage at the least cost. Some idea of the labour and capital account of a mixed or general market garden on an extensive scale may be

gathered from the following extract from an interesting article in the 'Journal of the Royal Agricultural Society' by Mr. H. Evershed, who says :

"Mr. W. W. Glenny has been good enough to permit me to give an account of his garden farm at Barking. It consists of 150 acres of gravel loam, made rich and friable with manure, and kept in the highest state of cultivation. The farm is entirely in vegetables, with the exception of eighteen acres of permanent pasture, and sixteen of wheat, on the stiffest land, which is farthest from the railway station. At the time of my visit the acreage of the farm was thus appropriated : potatoes, 34 ; permanent pasture, 18 ; spring-sown and Lisbon onions, 15 ; cabbage, 12 ; red ditto, 2 ; seed-beds, 2 ; carrots, 7 ; parsnips, $9\frac{1}{2}$; French beans, 6 ; scarlet runners, 3 ; vetches and green food for horses, 4 ; parsley, $1\frac{1}{2}$; willow and osier beds, $1\frac{1}{2}$; wheat, 13 ; mangold, $1\frac{1}{2}$; peas, 8 ; asparagus, 1 ; men's allotments, 1 ; cucumbers and marrows, 2 ; seeds, 1 ; buildings, roads, brook, and small crops, such as sage, &c., 11. Twelve horses are kept to cultivate the farm, convey the produce a distance of eight miles to London, and to cart manure. The sums paid for dung, exclusive of cartage, during the past three years have been 211*l.* 9*s.* 3*d.*, 271*l.* 16*s.* 7*d.*, and 278*l.* 15*s.* 2*d.* From 400 to 700 bushels of soot were also used in each year. About one-half of the dung is purchased at 3*s.* or 3*s.* 6*d.* a ton, and is drawn from London in the empty vegetable waggons ; the remainder is bought at 5*s.* per ton, at the railway station or quay. Some other manures, including the spent hops from an adjoining brewery,

are also brought on this farm. The live stock consists of a couple of milch cows, and forty or fifty pigs during the winter. The labour bill, including beer, is 1500*l.*, or 10*l.* an acre. At the time of my first visit, June 17th, the number of labourers employed, including ten women, a wheelwright, and a salesman, was thirty-five, and their wages amounted to 30*l.* a week. During the winter five women are employed preparing goods for market, bunching leeks, pulling and bunching greens, putting up onions, &c. The implements of the farm, besides carts and market waggons, consist of common ploughs, a double-breasted or ridging plough for moulding potatoes, beans, and peas, and some hand-drills.

“A small patent tool, which resembles a Dutch hoe put on wheels, must be mentioned, because its use shows the mechanical effects of dung and good culture in making the surface friable. It is not uncommon for a man to push this little implement over two acres in a day, cutting up all the weeds between the wide rows of the garden crops. A willow bed supplies bunching rods for tying the bunches of onions, greens, &c. The plants are set at 2 feet by 18 inches, and the bed lasts twelve years. Osiers of coarser habit are grown to make baskets for vegetables and fruit. I may note that the cost of the baskets (with a few sacks) used on the farm exceeds 50*l.* a year.

“The cost of baskets, transit charges, and market dues, is estimated at 50*s.* per acre in large market gardens. The weekly wages of the hands vary from, boys at 5*s.* to 10*s.*, women at 10*s.* to 14*s.*, to men at

15s. to 25s.; but most growers get much of their labour done better by contract with their men at about the following rates: hoeing cabbages at 2 feet apart by 15 inches, first and second hoeing 5s. per acre; third hoeing, 4s. 6d. Potatoes, 3s. to 4s. per acre; these being afterwards chopped over by the day previous to earthing up. Carrots, broadcast, 3l. Onions, ditto, 4l. Lifting early potatoes by fork and sorting them into first, seconds, and "chats," placing them in 56-lb. sieves, or 112-lb. baskets, 8s. per ton, or 24s. to 30s. per acre. Picking peas, in which occupation hundreds of children and women are employed in the season, 4d. to 6d. per bushel. Pulling, bunching, washing, and loading early carrots, 7s. per twenty dozen bunches. Fruit picking, especially bush fruits, strawberries, gooseberries, &c., employment in which thousands are engaged from early morning until evening in our large fruit gardens, the price paid varying from 4d. to 9d. per half sieve, or 3d. to 5d. per dozen quart punnets, according to the state of the crop."

In order to more fully illustrate the vegetable-growing industry, as carried on in the best London market-gardens, I cannot do better than describe the general culture of the principal crops under their respective headings, since in this wise my notes may be turned to practical account, if need be, by the reader.

As a profitable branch of horticultural industry, market gardening ranks high in the scale; thus, while a good crop of wheat on the best land, say eight quarters to the acre, is only worth 28l., onions on

light soils are worth 40*l.* to 50*l.* per acre at least; indeed on poor land, onions pay better than any other vegetables, and during the winter, after the crop is cleared off, the land may be planted with lettuce or spinach, as a catch crop, and these will be worth at least 20*l.* more. On the same area a crop of leeks, cabbages, and French beans in summer is worth at least 40*l.* A well-cultivated crop of early potatoes in July, three weeks or a month before the general crops are ready, is worth 2*d.* per pound, or about 100*l.* per acre. Early potatoes are a first-rate preparation for strawberries. An acre of cabbages, 20 inches apart, or 17,000 plants, if sold at one penny each, realize 70*l.*, and in dry summers, when cabbages readily fetch 1*s.* 6*d.* to 2*s.* per dozen in Covent Garden, this crop is a most lucrative one. An acre of early white Cos lettuce, one foot apart, at 1*s.* per dozen, will be worth 80*l.* or more if the crop is a good one. The cost of cultivation varies from 5*l.* per acre in large gardens to 10*l.* or even 20*l.* in small ones, and rent near large towns varies from 4*l.* to 7*l.* per acre, but if fruit trees are established on the land, then as much as 10*l.* to 15*l.* per acre is frequently paid and is often cheaper even at this high rental than is land at 5*l.* without fruit trees.

CULINARY VEGETABLES.

THE POTATO is well known to be one of our principal vegetable food crops, and, apart from the enormous quantities eaten in a fresh state, many hundreds of tons are yearly used in the manufacture of starch and gum. There is now a host of new American and other varieties, many of which are a great improvement on the older ones as regards handsome appearance and cropping qualities, but in point of flavour, when cooked, many are much inferior. London market-gardeners are fully aware of this, and only grow such kinds as are known to be of good quality.

The chief varieties grown near London are, Myatts, Ash-leaf, Lapstone kidney, Dalmahoy, Regents, and similar kinds. The ground allotted for potato culture is generally the lightest, warmest, and driest at command, and under these circumstances the crop comes to maturity much sooner than it otherwise would do, and moreover the tubers are of superior quality. Mr. Myatt, of Deptford, who is a large grower, plants in rows 2 feet apart, the ground having been previously manured and trenched, and levelled down with the plough. Planting generally commences as soon after the middle of February as the state of the weather will permit. Mr. Jessop, of Chiswick, who grows chiefly Dalmahoy, plants his in drills $2\frac{1}{2}$ feet apart, and

about 18 inches from set to set in the rows. These he plants in March, and they come into use in August and September. Mr. Dancer, of Little Sutton, and others, plant potatoes between rows of bush fruit trees. Other growers plant between their spring cabbages by means of a dibber, and in this case, as soon as the potatoes appear above the ground, the cabbages are pulled up and taken to market. When the potatoes get up a little they are earthed up, and Brussels sprouts or sprouting broccoli are planted between the rows. Before these can do any serious injury to the potatoes, the latter are ripe and are consequently dug and sent to market, saved for seed, or for home consumption as the case may be.

The summer culture consists chiefly of earthing up, and in keeping the ground clean by means of the hoe. The crop is sometimes lifted with steel forks, but as a rule by means of the plough, which is the most expeditious way. The tubers, when unearthed, are sorted into sizes, and put into bushel and half-bushel baskets, which are covered with haulm and fastened down with hazel sticks. As soon as the potatoes are gone, the haulm is carted to the manure heap, and the ground heavily manured, ploughed, and planted with other crops, such as turnips, late celery, or transplanted onions and leeks.

The area of potatoes in 1876 was less than that in 1875 by 17,740 acres, and 15,517 acres below that of 1874. These facts seem to show that the potato generally is giving way to more remunerative and certain crops. One of the most important points in

potato culture is change of soil, and during the last two or three years, large quantities of a kidney variety, named "Yorkshire Mites," have been bought by the Cornish growers for seed, and over 40*l.* per acre has been made of the produce of this variety, but new or choice kinds grown for seed will fetch even more. For general crops, York or Dunbar Regents, Dal-mahoy, and Scotch Roughs are excellent sorts for early use, and Patterson's Victoria for late crops are good. Porous, deeply stirred loamy soils, inclining to sand rather than clay, produce the best crops. An acre of potatoes costs about as follows:

	£	s.	d.
Rent and Rates	2	0	0
Implements	1	3	0
Cultivating and earthing, &c.	0	10	0
15 tons manure at 10 <i>s.</i> per ton	7	10	0
6 cwt. artificial manure at 9 <i>s.</i> per cwt.	2	14	0
15 cwt. seed at 5 <i>s.</i> per cwt.	3	15	0
Digging, sorting, and delivery	2	0	0
Total ..	£19	12	0

It is, however, not fair to charge all the cost of manure to the account, as part serves for the succeeding crop. Over ten tons per acre may be grown at the above cost, and a good after-crop of cabbage or greens obtained without much extra cost for cultivating, and none for manure, therefore we may deduct 3*l.* 8*s.* from the total, and thus reduce the cost of the potato crop to 16*l.* 4*s.*, still, however, a large sum, and only justified on good light dry land, where one can

feel certain of success. A crop worth 25*l.* per acre pays, and, more than this, is readily obtainable by growing new kinds for seed, or the best kinds for table use. All haulm and weeds on potato land should be burnt.

In one locality in Lancashire, the parish of Ormskirk, and parts of several other parishes, the culture of early potatoes is conducted in a manner scarcely known elsewhere. Cottagers and small farmers are principally engaged in this industry, and as much as 70*l.* has been offered by the local dealers for the produce of a little cottage garden not half large enough for the support of a cow. The potatoes are planted in February on beds of light, rich earth, protected by walls of turf, and reed or straw screens or frames, these being used in rough or frosty weather, and lifted off when the weather is mild and sunny, an occupation which employs the labour of the cottager's wife and children to good advantage, and in an independent and unobjectionable manner. The potatoes are ready to dig in May, and when unearthed are packed in neat hampers of about 20 lb. each; not unfrequently 1*s.* per pound is realized for the earliest and finest produce of this local and profitable industry, which finds its way to the Blackburn, Bolton, and Manchester markets.

During the last few years a remunerative industry has made rapid progress in the Channel Islands, where, owing to the difference in the climate, the potato crop reaches maturity earlier in the season than is the case in many parts of England, and con-

sequently a ready market is found in London, where the Channel Island produce competes successfully with that from southern Cornwall, the Scilly Islands, and Normandy. Every year the quantity of early potatoes from Guernsey and Jersey increases so much indeed, that these islands are likely to become potato gardens ere many years elapse. Most of the people who possess a patch of ground make a point of cultivating this crop either in the open air or under glass, as the case may be. Many acres of pits, frames, and glass houses are devoted to potatoes, and French beans, salads, &c., during the winter and spring months, and during the summer and autumn they are devoted to grape vines. In these houses the potatoes are ready for digging very early in the spring, when they are sold for as much as 1s. or even more per pound to the Covent Garden dealers. Some idea of the extent already reached by this new industry may be formed from the fact, that during two months of the potato season of 1876, 22,623 tons were exported from Jersey alone, the value of this quantity being 215,000*l*. From trustworthy data, it has been calculated that the cultivation of this vegetable alone yields annually a return of 7*l*. 10*s*. for each acre in the island of Jersey.

The extent to which we are annually indebted to other countries for potatoes alone is shown in the appended extract from the Government returns. Our total exports of potatoes scarcely exceed 1000*l*. in value.

	Cwt.	Value. £
From Germany	218,400	48,391
Holland	694,071	172,829
Belgium	635,626	124,225
France	3,055,762	668,321
Portugal	30,299	19,250
Malta	50,733	31,137
Other countries	11,241	6,823
	<u>4,696,132</u>	<u>1,070,976</u>

THE ONION is a very remunerative market-garden crop, and one which is most successfully cultivated in the neighbourhood of London, and more especially in the Fulham, Chiswick, Woolwich, Deptford, and Mitcham districts. Large quantities are sent from Hertfordshire; and Sandy in Bedfordshire is also noted for onions as well as for outdoor cucumbers. The Sandy growers save large quantities of onion seed, which attains to a high state of perfection on their rich warm soil; and this is a profitable crop when it can be harvested in dry weather. Well-formed bulbs are carefully selected for seed bearing, and these are planted in the spring in rows which vary from 2 feet to 6 feet apart—lettuce, radishes, spinach, or other low-growing vegetables being grown as intermediate crops. After the flower stems make their appearance, they are staked at intervals, and twine or cord is strained on either side the rows, to prevent the stems being beaten down by hail, rain, or wind. Ordinary onion seed fetches from 2*s.* to 5*s.* per lb., according to the season; but the best seed, or that from improved or rare sorts, is more valuable.

Onion culture is most successful on deep well-tilled soils; those which incline to sand rather than to clay are preferable, and the bulbs produced on well-drained or gravelly subsoils are found to keep better than those from soils which rest on the clay. Land intended for onions is generally roughly trenched during winter, being thrown into ridges so as to become thoroughly pulverized and sweetened by the action of frost. During dry sunny weather in February, the ridges are levelled, and the surface rendered smooth by harrowing and rolling, after which the seed is sown either broadcast, or in drills 9 inches to 10 inches apart. From 9 lb. to 12 lb. of seed per acre are required for an ordinary crop of keeping bulbs, but if small pickling bulbs are desired, the seed is sown much more thickly, 20 lb. to 30 lb. per acre being used. After sowing, the seed is raked or harrowed in, and the operation is completed by rolling the surface firm and even. After the young onions appear above the ground, weeding and thinning are proceeded with as may be required. The varieties generally selected by growers for market are the Reading or white Spanish, Deptford, brown Spanish, James's keeping, Silver-skin, and Two-bladed for pickling, while the Lisbon and Tripoli varieties are sown in August to produce young salad onions during winter, and bulbs for spring use. The Deptford variety is one of the best sorts, producing heavy firm bulbs, which keep well through the winter months. Broadcast sowing is considered the best for spring-sown crops, as involving less labour; and as the bulbs

after thinning, stand at regular distances apart over the whole area, the produce per acre is considerably more than when sown in beds or lines. Those sown in the autumn are, however, always drilled on beds 4 feet or 5 feet wide, these being divided by narrow alleys, which serve as walks for the labourers who weed the beds, and draw the crop as required for marketing. The autumn sowings are generally made on land which has been cleared of cauliflowers, cabbages, or other early crops.

The profits on a good crop of spring-sown onions are considerable, although prices vary from one year to another as much as 50 per cent. For example, Mr. H. J. Morgan, Lodge Farm, Barking, tells me that in 1871 he sold his onions for 43*l.* per acre when growing, and the purchaser who harvested the bulbs, made much more of them in the market. The following year, however, the highest price which could be obtained was 30*l.*, although the crop was equally as fine as that of the preceding year. The same season Mr. Aberhaut, of Mitcham, had a field of onions which averaged 16 tons to the acre, and this crop realized 12*l.* per ton, or 192*l.* per acre in the market. Mr. Bagley, another grower at Turnham Green, had a splendid crop the same season, and this he sold at 40*l.* per acre on the ground, the buyer undertaking to harvest and market the produce.

A fair crop of onions will average from 12 tons to 15 tons to the acre, and the average value varies from 30*l.* to 50*l.* per acre on the land, but a much larger price is obtainable if the grower has facilities for

harvesting and marketing. A correspondent of the 'Gardener's Chronicle' (September 30, 1876) states that he has grown 30 stones of onions on a rod of light land by deep cultivation and liquid manure waterings. This crop would be about 30 tons to the acre, but it must be an exceptional crop. An average produce of 15 tons per acre may be relied on under ordinarily good culture, allowance being made for bad seasons and the ravages of the onion fly. The average price for good sound-keeping onions in Covent Garden Market is 4s. per bushel. Inferior bulbs are worth 2s. to 3s. per bushel, while the finest selected large bulbs, or the best silver-skinned pickling onions, often realize 8s. or 10s.

Leeks are largely grown in London market-gardens and fetch remunerative prices during the autumn and winter months, when they are in demand for vegetable soups, or as a mild substitute for onions in other dishes. Deep rich soils are most suitable for leek culture. The culture of the first crop commences in February, when seed is sown on a gentle hot-bed; and after the young plants make their appearance, they are protected at night or during cold weather by being covered up with mats or loose litter, ventilation during fine sunny weather being also necessary. Weeds are kept in check; and if, as sometimes happens, the young plants are too crowded, they are thinned. About the latter end of March or beginning of April, drills are drawn, 10 inches to 15 inches apart, on a plot of well-tilled land, and in these the young leeks are planted 6 inches or 8 inches apart. After planting,

periodical hoeing, weeding, and earthing-up operations are performed, and in some gardens the first crop is assisted during dry, hot weather by copious supplies of water. The first out-door sowing is made in drills about the middle of February, and is succeeded by two other sowings at intervals of a month or six weeks apart, a succession of produce being thus obtained during the winter and spring. The produce of the first sowing is fit for market about the end of July or beginning of August, and is quickly cleared off and sold, so as to make room for a secondary crop of lettuce, radishes, or spinach.

The late crop of leeks are often sown widely apart in the rows, and intercropped with radishes, lettuce, parsnep, beet, or other low-growing vegetables; while not unfrequently leeks are themselves used as a catch-crop by being planted between rows of asparagus, broccoli, strawberries, or for filling up vacant places among bush fruits or other crops. The best varieties are the London flag for the first or early-sown crop, and the Musselburgh, a long-necked hardier sort, for the late crops. Leeks for market are stripped of their outer or soiled leaves and washed, after which they are tied up into fan-shaped bundles of six to nine heads, according to size. These bundles are sold at prices varying from 2s. to 6s per dozen. The finest examples in the main crops are marked and carefully transplanted to a warm sheltered corner, where they are allowed to seed.

Other alliaceous crops, as garlic, shallots, and rocambole, are more sparingly grown in market

gardens, owing to their being used in small quantities for flavouring purposes, rather than in quantity as substantial food plants. All these may be planted in March, in rows a foot apart. They are generally propagated by offsets from the old bulbs, or "chives," as they are technically called; but if large quantities are cultivated, then seed gives the best results, and this practice is successfully followed by Mr. Trigg, of Hayling, and also by the Jersey and Guernsey growers, who send the main supply of these high-flavoured esculents to our metropolitan markets. Seed is sown broadcast or in drills a foot apart in March or April, and the after-culture is similar to that recommended for onions. Both garlic and rocambole are highly remunerative crops. The demand is not so extensive as for onions and leeks, but then the prices obtainable are much higher, the ordinary retail price being 6d. per lb. An acre of good land will produce from 6 tons to 10 tons of garlic from seed, and the wholesale value of this produce varies from 100l. to 150l., not at all a bad return. Garlic is one of the most wholesome, and, when properly prepared, most delicious of all vegetables, and the one of all others which a French cook would least like to be without. It is much used throughout Southern Europe and in the East now, as from time immemorial. In Spain a delicious relish is made by pounding garlic in a mortar with olive or salad oil until it assumes the consistence of honey, a little lemon-juice or apple-pulp being added if the flavour is considered too pronounced.

ASPARAGUS is one of the oldest of all cultivated

vegetables, the Greeks and Romans having grown it as far back as two hundred years before the Christian era. It is a native of Europe, and is found growing wild near the sea. Asparagus was supplied in a forced state to London markets as early as 1670, and it was then brought to quite as high a state of perfection as at the present day. Pliny indeed mentions a variety being grown in his time, three heads of which would weigh a pound.

In warm early seasons, the asparagus forms a remunerative crop to the market gardener; but when cold winds prevail until late in the spring, the season of cutting is materially shortened and the profits considerably lowered. The greatest drawback in the cultivation of asparagus is, that at least three years must elapse from the time of planting, before any substantial returns are forthcoming. Indeed the profits of the third year are very small in comparison to the expenses incurred in producing it. During the three years that the ground is occupied in bringing the roots to a bearing state, from nine to twelve other crops might have been gathered with less injury to the soil; for even in a young state the asparagus is a gross feeder, and unless it be supplied with the essential feeding substances, loss of land, time, and money is the result. It is therefore a matter of consideration whether this crop really is as profitable, as the high prices obtainable for the produce would lead one to expect.

As a market-garden crop, it is extensively grown in the valley of the Thames, near Fulham, Mortlake,

and Isleworth, many growers devoting several acres of land to its cultivation. The seed is harvested late in the autumn, and sown in February in rows from 18 inches to 2 feet apart, between fruit bushes or moss roses, avoiding as much as possible situations where shade is likely to prove injurious to the young plants. Some growers, however, sow in open fields, and plant cabbages, potatoes, or Brussels sprouts between the rows. The young seedlings are thinned out a little if found to be too thick, the ground kept clear of weeds by frequently hoeing over the surface, and this ends the first year's growth. In the spring of the second year the plants are carefully lifted and planted in rows on ridges, or in beds varying in width from 6 feet to 9 feet. The bed system is, however, fast going out of practice, and is being superseded by the more simple method of planting in straight rows of equal distances apart. Mr. Jessop, of Chiswick, is a most successful cultivator of asparagus, and he plants his in single lines 8 feet asunder, but the usual method is to plant not more than 5 feet apart. The ground which is to receive the plants is deeply dug or trenched, and heavily manured late in the previous autumn, and marked off into 4-foot beds, with intervening alleys 1 foot wide between them. The beds are then sown with radishes, and in March or April the alleys are dug and planted with the asparagus plants. The radishes are generally cleared off by the beginning of May, when the beds are slightly manured and dug over, and sown with beet or onions, and leeks transplanted on them. In the autumn these are

use they are great adepts; they slip it down by the side of the shoots, and sever them from the crowns without injury to them or the adjoining shoots. After cutting, the "grass" is tied in bundles of 105 heads, and sent to market overnight or early in the morning. Its price varies with the season and supply.

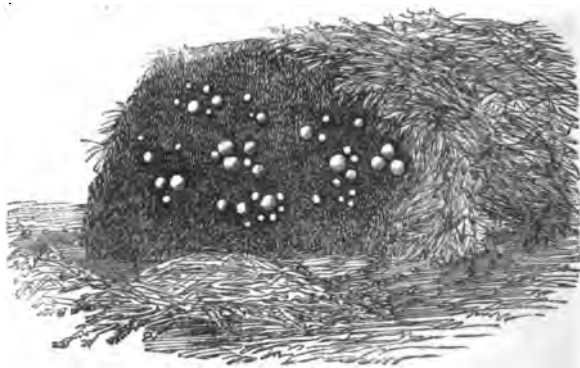
The French now send large consignments of "grass" to our markets; and they, having a warmer climate than we possess, are able to supply better heads in February than we can in May; indeed, at Christmas there is abundance of French asparagus in Covent Garden from the neighbourhood of Angoulême. Mr. Harwood, a large asparagus grower at Colchester, forwards all his produce to Covent Garden Market, the average lengths of his bundles being 9 inches. The following are the weights of some of his best produce and the years in which it was grown, the length of the bundles being 10 inches.

1872	50	heads	weighed	..	..	..	..	7 lb.
1873	50	"	"	..	..	..	..	7½ lb.
1874	50	"	"	..	..	..	..	8 lb. 14 oz.
1875	50	"	"	..	..	..	..	8 lb. 2 oz.
1876	100	"	"	..	..	..	..	15 lb. 8 oz.

English "grass" fetches in April from 3s. to 8s. per bundle, but in May and June 2s. 6d. or 3s. is considered a good price. Forced produce is of course much more valuable, indeed, a less price than 7s. 6d. per 100, does not remunerate the grower. In America asparagus is largely grown; and at Oyster Bay there is an extensive farm devoted to this crop, the varieties cultivated being Canover's colossal and purple topped.

The French growers have the green and purple topped, and also a giant variety, which is similar to that of Grayson's Covent Garden, a well-known and highly esteemed kind in London market-gardens.

MUSHROOMS, TRUFFLES, &c.—From the month of September to April, enormous quantities of mushrooms are annually disposed of in Covent Garden Market, and in some seasons realize very remunerative prices. They are usually packed in small baskets and punnets and sold at from 6*d.* to 2*s.* 6*d.* per basket, according to quality. Mr. Steel, of Fulham Fields, and Mr. Dancer,



OPEN-AIR MUSHROOM BED IN A LONDON MARKET-GARDEN.

of Chiswick, are probably the two largest growers. In dry, frosty seasons mushrooms are considered by market gardeners to be one of their most remunerative crops.

Some persons cultivate mushrooms in ordinary frames, but the general practice is to grow them on ridges in the open air; these ridges are composed of short

stable manure, laid from 2 feet to 3 feet thick, slightly tapering towards the top. This is firmly trodden down and allowed to remain until the temperature of the bed has reached its height, and is again on the decline, when the spawn is introduced, and the bed covered with a thin layer of good garden soil. This is made solid by being well beaten with the back of the spade. Market gardeners formerly made their own spawn, but they now find it much cheaper to buy it, although home-made spawn can, as a rule, be more fully depended upon. In spawning, the cakes are broken up into small pieces about the size of a walnut, which are introduced into the beds in rows, from 9 inches to 12 inches apart each way. Should the soil be dry, a good soaking of water is applied, and the beds are left until the heat is found likely to get too low, when warm coverings are added, as required. The first ridges are generally made in July, the second series in August, and the last in September. Under favourable circumstances, the beds come into bearing in eight or nine weeks after being spawned. In gathering, the coverings are removed by one man, and after him come others with baskets into which the mushrooms are put, and, following the gatherers, is another man, who replaces the coverings, it being very important that the beds should at no time be subjected to exposure too long. By the end of April, bearing ceases, and the ridges of manure are either wheeled away to other parts of the ground, or planted with early tomatoes, which crop generally succeeds well, inasmuch as the beds being warm, the roots of the

tomatoes soon get firm hold, and supply a crop of fruit much earlier than can be obtained from plants in the open ground.

The French mushroom growers prefer caves or quarries in which to grow this esculent, but such are not absolutely necessary, since they succeed in any low covered structure at all seasons, and, as we shall presently see, in gardens among other crops, without any especial system of culture, save the introduction of spawn. Without a doubt the extended culture of this esculent is to be desired, and the cultivator need not limit his operations to the common mushroom, (*Agaricus campestris*), since the parasol agaric (*A. procerus*), the Champignon, Chantarelle, Fistulina, some Boleti, and other kinds, are valuable food plants, and as well deserving of intelligent culture as the milk-white variety of our meadows.

The essential conditions for mushroom growth are a genial humid heat of 60° to 70°, and a moderate amount of light. The common mushroom is readily propagated by "spawn," which is made by introducing the mycelium from a mushroom bed or pasture into a compost of cow-dung, horse droppings, and hazel loam well mixed together and pressed into flat bricks. Thus treated, and kept in a dry place, the germs of fungoid growth or mycelium remain dormant for years without injury, and readily start into growth when the brick-like masses are broken and the pieces inserted in beds of fermenting horse-dung and soil. I am not aware that anyone has experimented with the mycelium of other edible fungi, but seeing that many

are as nutritious, and even more palatable than the mushrooms of our meadows, there is here an open field for progress. If we can obtain a supply of spawn of the best edible fungi, prepared on the same plan as that above described, we may then look forward to the probability of fungi being added to our list of nitrogenous foods far more generally than is now the case, seeing that the natural supply from woods and fields is but a promiscuous one.

In the use of the different species of fungi as food, we are far behind the inhabitants of Russia and other countries of Northern Europe, where nearly all kinds, poisonous or not, are used extensively, immense quantities being preserved in tubs of vinegar and salt for winter use, a course of preparation which seems to neutralize the deleterious properties of the poisonous kinds.

The different kinds of truffles are perhaps among the most useful and delicious of all fungoid growth used as food, and their artificial propagation and culture deserve every attention, especially on those calcareous and partially wooded lands where they naturally exist. In France and Italy the partial culture of truffles is carried on, and in Wiltshire and Hampshire, whence our principal home-grown supplies are drawn, some system seems desirable, since at Loudun, Poitou, and Bovardeline a course of partial culture is successfully carried on by planting truffle refuse and such tubers as are not fit for culinary purposes, and it is interesting to find that this taking advantage of favourable conditions has proved highly

remunerative, the produce of some lands otherwise worthless, except for timber, being worth from 10*l.* to 30*l.* per acre for the truffles alone. The total value of the truffles produced in France during the year 1872 was estimated at from 70,000*l.* to 80,000*l.*, and these figures give some idea of what value to this country a well organized and successful system of truffle culture would be.

Mr. Tillery succeeded in forming a productive truffle plantation in the calcareous soil of a young oak plantation at Welbeck, by replanting the parings and over-ripe ones from the kitchen, and his success might well be imitated wherever the soil is favourable to their growth. Some idea of the value of a truffle plantation may be formed from the retail price of truffles, which varies from 3*s.* to 20*s.* per pound according to the kind, since some varieties are more highly esteemed than others.

CUCUMBERS have been cultivated in the East for thousands of years, and, according to Pliny, were largely grown by the Greeks and Romans, and the Emperor Tiberius had them on his table every day in the year. In England these fruits were grown as far back as the fourteenth century, but owing to some unexplainable cause, their culture was for many years neglected. Since, however, they have again been introduced and become popular, they have so risen in public favour that it is scarcely possible now to overstock the markets with them at any period of the year. In Russia this fruit is consumed in large quantities by all classes of society, black bread and cucumber, indeed, forming the staple food of the peasant population.

Cucumbers are now most extensively grown in market gardens, many cultivators devoting to their culture not only acres of ground, but also many acres of glass. Some growers cultivate them in houses, others in pits and frames, or sunken hot-beds; the former is generally calculated to give the best results with the least trouble. Some idea of the extent to which this crop is grown may be obtained from the fact, that individual growers often send to market weekly, during the summer months, as many as two hundred dozen fruits. For framework the seeds are sown early in February in small punnets of soil placed in a warm temperature, and as soon as the seeds have germinated, and the plants are large enough to pot off, they are placed, two in a 6-inch pot, and are still kept in heat, and as close to the glass as possible without actually touching it. When the plants become strong, and fill the pots with roots, they are carefully planted out on beds in pits or frames, which are prepared for them in the following manner. As early as the frames can be spared, which is usually about the end of February, trenches are dug out 2 feet or 3 feet deep, and 6 feet wide; the length depending upon the quantity of frames to be occupied. This done, the trenches are filled up with fermenting manure, which is firmly trodden down and afterwards covered over with 4 inches or 5 inches of rich, light soil. The frames are set upon this, and banked up all round with the soil that was taken from the trench; the sashes are then placed on and kept close until the bottom heat is found to be of a suitable temperature to receive the plants, one potful being placed under the centre of each light.

One plant is trained towards the back of the frame and the other towards the front.

For the first week or so after planting, a little shading is given to the plants during bright sunshine, but no more air is admitted than is necessary to dispel any rank steam that may arise, and a thick warm covering is afforded them at night, until warm weather sets in. Another sowing is made to succeed this early in March, under exactly the same conditions as the former one, the only reason for making two sowings being, that the sashes are not always at liberty so early in the year as the first crop is planted. As the plants advance in growth, attention is paid to regulating and watering the vines, and removing any superfluous growth that may occur. When the plants show bloom, the points of the shoots are kept regularly stopped one joint past the fruit. During hot weather, abundance of water is supplied to the roots of the plants, and when in full bearing frequent applications of guano water are given overhead, with a view to promote healthy growth, and drive away red spiders, one of the most minute and troublesome of all plant pests.

The greatest drawback to the culture of cucumbers in market gardens is probably that of being obliged to apply cold water from the pump direct to the roots of the plants. Although this evil is obviated as much as possible by keeping tanks and cisterns constantly filled and exposed to the sun, yet considering the enormous quantity of water required, it is impossible to have it all in a tepid state. Air is admitted in abundance during fine days, but is given gradually as

the heat of the day increases, and is reduced as it declines, always aiming to shut in as much sun-heat as possible without injury to the plants.

The fruit is cut for market three days a week, the straight ones being packed into large square hampers, and the crooked ones sold for pickling. As one straight fruit is more valuable than several crooked ones, long cylindrical glasses, open at each end, are in some cases employed, into which all young fruits that have a tendency to grow crooked are placed. A supply of good fruit is generally obtainable until the end of August, by which time the plants begin to show signs of exhaustion, and the fruit becomes seedy and unshapely. A few of these are saved for seed, which, when they become ripe, are cut and laid out to dry, previous to the seed being separated from the pulp.

Many market gardeners on a large scale, grow their cucumbers in long span-roofed houses, and from these they are enabled to send a supply to market at every season of the year, but men with limited means are frequently obliged to adopt far less elaborate structures than these; indeed, the results obtained from the simple contrivances employed by some growers is really astonishing. We sometimes see small, shabby old houses devoted to cucumber culture producing immense crops of excellent fruit. Some market gardeners with small space of ground, devote their time exclusively to cucumber and tomato growing, and a very good living is thus realized by them.

In many small gardens, near London especially, cucumber culture is carried on in such a profitable

manner as to be well worthy of mention. The structures are long, narrow, lean-to hot-houses, against low brick walls ; they are from 60 feet to 70 feet long, and 8 feet to 10 feet wide, and through the roof being so very low, headroom is gained by a sunken pathway along the middle, several feet deeper than the ground level. On each side of the pathways, and extending the whole length of the houses, are wooden troughs 3 feet wide, and 9 inches or 10 inches deep, with perforated bottoms. A layer of rough turf is placed in the bottoms of these to act as drainage, and upon this is placed an admixture of turfy loam and decayed horse-droppings to within a few inches of the top of the trough. The plants are then put out in this, two feet apart, and are grown with straight stems about 8 inches long, and trained on wire or string, and sometimes rough wooden trellises are suspended about 1 foot from the glass. Plants for spring bearing are planted in October, the object being to have a good supply of fruit while the demand and prices are good. As the plants advance in growth, and the soil becomes filled with roots, slight top dressings of road sand and horse manure are applied from time to time, and as soon as fruit bearing commences, copious supplies of liquid manure are given. The most noticeable thing in the whole affair is the extraordinarily small quantity of soil that is allowed for the roots to grow in ; and it is quite evident from the enormous loads of fruit the plants have to carry, that strict attention must be paid to feeding the roots with manure water and other stimulants. The heating apparatus consists of a row

of earthenware socket pipes running all round the house, forming a flue which supplies both top and bottom heat to the plants. This flue is placed close under the troughs that contain the roots, and in this manner large quantities of the finest fruit are obtainable. The varieties of cucumbers grown by market gardeners are Telegraph, Sutton's Perfection, Syon House, and Rabley Prolific.

The culture of cucumbers in the open air near London is not so extensively carried on as formerly, the results obtained in recent years not being sufficiently encouraging to induce growers to devote a large area to this crop. The principal supply of fruit sent to Covent Garden is cultivated at Sandy, in Bedfordshire, and at St. Neots, in Huntingdonshire, at both of which places a considerable area is annually devoted to this branch of industry, the soil being of a much warmer and more friable nature than that of London market-gardens; but even in the warmest of light soils, the crop is not altogether a satisfactory one when the summers are wet and cold. The ground for cucumbers is prepared by being deeply cultivated and heavily manured during the winter and spring, and in May the seed is sown in patches two or three feet apart in rows four feet asunder. Four or five seeds are sown, in a patch, and the young plants are afterwards thinned, one or two only of the strongest being allowed to remain. In mild, showery seasons, the plants grow very rapidly, and soon come into bearing, hoeing among the plants, and thinning or regulating the growth being the only operations needed. When the

weather is dry and hot, however, copious supplies of water or partial irrigation are necessary. The bare spaces which occur here and there, owing to the partial failure of the plants, are filled up with onions for seed, peas, potatoes, tomatoes or other intermediate crops. Gherkins are simply cucumbers cut when only two to four inches in length, and as these are always much in demand for pickling, they fetch remunerative prices. Gathering the fruit usually commences in July, and continues twice or thrice a week until late in September. Cucumbers produced under this system of culture vary in length from three to twelve inches, and are sorted and packed in flat hampers—technically called “pads”—each containing about two bushels. The money value of an acre of cucumbers depends entirely on the weather, but at the low price of 2*d.* a dozen, as much as 50*l.* or 60*l.* an acre is realized in moderately favourable seasons. Some idea of the importance of this branch of culture may be gathered from the fact, that from 500 tons to 600 tons per week are sent to the London markets during the cucumber season.

CABBAGE FAMILY.—The whole of the cabbage tribe have of late years been much grown for market at almost all seasons of the year. The cabbage, which is of the most importance, was probably introduced to England by the Romans, who are also said to have disseminated it in other countries. It was grown in England for many years before it was even known in Scotland, it being eventually carried into that country by some of Cromwell’s soldiers in the time of the

Commonwealth. In Germany immense quantities of cabbages are yearly preserved for winter use by packing them in large barrels with salt. The Savoy cabbage has been cultivated in our gardens for over three centuries, being probably derived from the same sources as the common cabbage, to which it is, however, inferior in flavour and general usefulness. The cauliflower is of great antiquity; the exact time when it was introduced to England is not known, but Gerarde mentions it as being grown as far back as 1597. The broccoli, which is supposed to have originated from the cauliflower, is spoken of by Miller in 1724 as coming from Italy, the white and purple kinds being probably both introduced at nearly the same time, and from these have arisen the many varieties now in cultivation. The Brussels sprouts, or bud-bearing cabbage, originated in Belgium, and has been in cultivation around Brussels, whence the name, from time immemorial. It has not been grown in this country in any quantity for more than twenty or thirty years, and most seedsmen still obtain their seed from Brussels yearly. The cabbage, Savoy, broccoli, cauliflower, and Brussels sprouts form the principal crops of the cabbage family in market gardens, the Scotch and other kales occupying the ground too long and requiring too much room in proportion to the small returns to be profitable. The principal crop of cabbage is usually sown on St. James' day, the 25th of July, on poor ground, the reason for this being that the plants do not grow so rapidly, and consequently come up more hardy and stand the winter better than they would do

if raised in rich soil. The seed is sown broadcast on beds 4 feet wide and any length, such widths being found the most convenient for weeding and hoeing amongst the plants.

The first batch of plants is transplanted into ground just after it is cleared of the potato and onion crop, and the second into ground previously occupied by celery, French beans, and similar crops. Indeed every available inch of ground is planted with cabbage. The plants are put 15 inches apart each way, and in early spring every alternate plant is pulled up and sold for coleworts, thus allowing the permanent crop plenty of space to arrive at maturity. As ground becomes vacant, cabbages are planted throughout the winter, and in order to keep the young plants in good condition for this purpose, they are transplanted from the beds to others, by which they are allowed more room. For yielding a supply in autumn and winter, sowings are made from March till May under the same conditions as the sowing just mentioned, only that they are planted a little wider apart at first and are intercropped with lettuces. The Enfield market is the kind usually grown in market gardens. Red cabbages are sown in March and July, the produce of the latter sowing being considered the best; they are allowed more space than white cabbages, viz. $3\frac{1}{2}$ to 4 feet apart, the spaces between them being cropped with potatoes, French beans, or lettuces. In consequence of red cabbages being in the ground a long time, a rich, solid piece of land is selected for them, and they are considered to repay this liberal treatment.

Coleworts are simply unhearted cabbages, and for spring use the Fulham cabbage is the one generally sown, but there are two or three kinds which develop themselves very quickly, and are therefore named coleworts; amongst them are the Rosette, Cock's Hardy Green, and the Blue colewort; the former is, however, the kind most esteemed in the market, and consequently is the one mostly cultivated. The seed is sown in May broadcast in open spaces, and when the plants are up they are thinned out with small hoes; when large enough to handle, the best of the plants are pulled up and planted thickly between rows of fruit trees, moss roses, root crops, French beans, &c. Spaces between celery ridges and asparagus beds are likewise planted with them. Whole fields too are sometimes cropped with coleworts, and are cleared in sufficient time to make way for winter radishes and other crops.

Savoys are sown in June and July, and treated in the same manner as summer cabbages, the principal crop coming into use in November or December. The Drumhead is the kind generally grown, and although it is a coarse variety, it yields enormous heads, which obtain a ready sale in London. Savoys are also used as coleworts by some market gardeners in the same way as cabbage.

Broccoli is a somewhat uncertain crop in the neighbourhood of London, on account of early frosts in the autumn, therefore only hardy sorts are grown, such as the Purple Sprouting, Snow's Winter White, Cock's Late White, and Walcheren, which latter usually comes

into use before frosts are liable to occur. Sowings are made from April to July, either broadcast or in drills, in well-manured ground. As soon as the plants are up, hand-weeding takes place, and they are afterwards thinned with small hoes, and when large enough, are transplanted between rows of bush fruit trees, potatoes, and in orchards; as this crop does tolerably well in a shady situation, it is seldom planted in an open quarter. Previous to planting, however, the ground is heavily manured, which in a measure compensates for loss of light and sun to the plants. Earthing up, or heeling in, is seldom practised by market gardeners, their time being too valuable to admit of such operations as these being performed. When the heads are turning in in the autumn, men walk between the rows daily and bend over such leaves as are liable to be injured by frost. The chief supplies of white broccoli brought to Covent Garden during the winter months are grown in Cornwall, Portsmouth, and other warm parts of the south and west of England, and heads of excellent quality are supplied in enormous quantities, which are sold at from 2*d.* to 6*d.* per lb., according to the size and quality.

Cauliflowers are reckoned as one of the best of green vegetable crops, when they can be produced early in the spring before peas and beans come in, but after these latter become plentiful, the demand for cauliflowers ceases, and they are therefore comparatively worthless. Seed is sown in frames, old hot-beds, and in open borders from August to September, and as soon as the plants are large enough, they are trans-

planted into patches 18 inches square, six plants being usually put into each patch. When severe weather sets in, hand-lights are placed over them, and sometimes these are covered up during continuous frosts with either straw or dry ferns. In the absence of hand-lights, bushel baskets are frequently used, but in this case they require more care in the way of protection and admitting light to the plants. In January and February, when the plants have become crowded, each alternate one is carefully lifted and planted in the unoccupied spaces between the hand-lights, and thus the piece of ground is fully occupied. The last planted are afforded protection for a time, and then the whole of the hand-lights or baskets are removed to protect the successive crop, which has been planted from the later-sown seed beds. When the heads begin to form, which they do in March and April, dry bracken or litter is sprinkled over the plants, and the outside leaves bent over the heads to protect them from frost. Cutting generally commences early in April and continues until June. A sheltered situation is always selected for spring cauliflowers, and soil of a deep rich character is generally assigned to them. Early London and Walcheren are the principal kinds grown for market. The trade in early cauliflowers was formerly a very lucrative one, but during the last few years the continental growers have competed with our own in the markets, and, having a warmer climate, they not only send in earlier supplies, but can afford to sell their produce cheaply.

Brussels sprouts are in great demand in the London

markets throughout the autumn and winter months, and during frosty weather, when broccoli becomes scarce, good sprouts realizing high prices, say from 1*d.* to 2*d.* per lb. Market gardeners as a rule do not, however, cultivate this kind of vegetable to such an extent as might be imagined, and this is doubtless owing to its occupying the ground for a long time, previous to yielding any returns. The seed is sown in April and May, in a warm situation, and as soon as the plants are up, they are weeded and thinned, and when large enough transplanted between rows of potatoes, asparagus, or any other crops where light and sun can reach them. It being necessary, in order to produce fine sprouts, to have the stems well ripened before the severe weather sets in, this crop is seldom planted under trees or other shady places. Sometimes whole fields are devoted to the culture of Brussels sprouts, and in this case the ground is heavily manured, and deeply ploughed and levelled, and the plants inserted in rows 3 feet asunder and 2½ feet from plant to plant in the rows. The crop is seldom, however, all planted at one time, it being desirable to have the sprouts come into use in succession, and to ensure this, some growers make two sowings, one a month after the other. The earliest sprouts are usually fit for picking early in October, when they fetch high prices for a few weeks, but afterwards fall in value until November, when most other green vegetables, such as scarlet runners, vegetable marrows, &c., are over. Brussels sprouts are then in great

demand, and are sold at from 4*d.* to 6*d.* per lb. Picking the crop is generally performed by women, who cut off the biggest and hardest sprouts from the stalks and put them into sieve or half-sieve baskets, which when full are carried to the end of the rows and emptied into bushel baskets, taking care to always have a few of the very best for topping up with. These baskets are then covered with fern leaves or dry straw, and bound down with hazel sticks, packed on the waggons, and sent to market. After the sprouts have been all picked from the plants, the heads are cut off, and sometimes the stalks are allowed to remain to furnish a second crop of greens, but most growers pull them up and plant the ground with other crops.

THE KIDNEY OR FRENCH BEAN is supposed to have been introduced into England from the Netherlands in the early part of the sixteenth century, whilst the well-known scarlet runner was not introduced until nearly a hundred years after that time. Both species form most valuable culinary vegetables, and are largely grown as summer market-garden crops. When French beans appear in the market, the demand for cabbages, cauliflowers, &c., begins to decline, but French beans always command a ready sale as long as they can be produced, overstocking the market with them being almost unknown. When the principal crops are in season, however, the prices are of course materially lower. Most market growers have their own selection from some favourite variety on which they pride

themselves, and take great care to keep pure. Newington Wonder, is, however, the variety most universally grown, but a few cultivators prefer Long-Podded Negro, and Black Belgian, Fulmer's Dwarf being the best for forcing in pots. There is now a variety named Canadian Wonder, that is fast finding its way into public favour, and, when better known, will doubtless become the principal kind cultivated by market gardeners.

The first crop of beans is sown about the middle of March in frames, which are kept closed until the seeds have germinated and the young plants appear above the ground; air is gradually admitted as the plants progress, until they become comparatively hardy, the glass being taken off entirely during fine days, and put on again in the evenings. The distance apart of the plants intended to remain in the frames is about 6 inches each way, but in addition some are sown much thicker for the purpose of transplanting, and these furnish the first out-door crop. Those to be grown under hand-lights are planted in squares 8 inches each way, so as to admit of the lights being readily placed over them when necessary; some growers place bushel baskets over them when hand-lights are unavailable, but in this case great care is necessary to prevent them from damping. In addition to those thus treated, a large plantation is made in rows, 18 inches apart, and 5 inches from plant to plant, in a warm, sheltered situation. Mr. Steel, of Fulham Fields, plants his under a high

hedge where the plants are fully exposed to the sun, but are protected from the north and north-east winds. This operation generally takes place about the middle of April, if the weather will permit. The plants are hoed up as soon as they are 4 inches or 5 inches high, and in favourable seasons they come into bearing very soon after those grown in frames. Mr. Bageley, and others, protect their first out-door crops by erecting barricades of straw hurdles, mats, &c., in such a position as to break the wind from the plants.

The first sowing out of doors is made in the second week of April in warm situations, the seeds being sown in lines, 2 feet or 3 feet asunder, and the young plants are eventually thinned out to 4 inches or 5 inches apart. This sowing is usually made on ground recently cleared of young onions, radishes, coleworts, &c., the drills being drawn early in the morning of fine days and the seeds sown in the afternoon, and earth drawn over them with the feet. Sometimes this early sowing is made between rows of cauliflowers, lettuce, &c., which shelter the plants until the weather gets warmer and they are strong and able to stand without protection; the cauliflowers, &c., are, by that time ready for market, and are cleared off, leaving the beans in possession of the soil. Failures, however, sometimes occur when too early sowings are made.

The next sowing is made in the third or fourth week in April under similar circumstances to the last, and through the months of May and June the main crops are sown once a fortnight in the open quarters.

The first crop obtained from plants grown in frames is generally ready to gather by the first week in June ; the second about two or three weeks afterwards, and these continue bearing until the main crops are ready, which is about the end of July. If kept closely picked, the main crops continue in bearing until the frost comes ; sometimes, however, the beans grow faster than they can be picked, in which case they do not last in bearing so long.

The produce is picked by women and boys, who put them into half-sieve baskets, these being carried when full to the end of the rows to be carted home and washed free from grit, and afterwards packed in half-bushel baskets covered with rhubarb leaves, and fastened down with stout withes and sent to market three days a week. The ground amongst this crop is kept rigidly clean, and all is done that is likely to benefit the plants, this being considered the most remunerative of all the summer vegetables. Most growers save their own seed, in which case they devote a piece of the main crop to the purpose, two or three pickings being made from it for market, and the remainder allowed to ripen ; the plants are then pulled up, tied in bundles, and slung in pairs across a rail or fence to dry, after which they are housed ready to be thrashed on wet days when the employées cannot work outside. Scarlet runners are treated in much the same way as the French beans, excepting that they are not sown until May. These are never staked, but are kept dwarf by frequently picking out the point of the shoots. It is interesting to know that the success of this crop is

entirely dependent on fertilization by hive bees, and also that the plant is, in its native South American habitat, an unfruitful perennial.

PEAS either in a green state or when ground into meal are very generally used as food; indeed, in the latter state, they are considered to be more nutritious than any other vegetable. Peas were introduced into our gardens from the south of Europe during the time of Henry VIII. and in the reign of Elizabeth they realized high prices as one of the rarest dainties of the time. Even in plentiful seasons peas are considered by market growers to be a profitable crop, and hundreds of acres of land are devoted to their culture. The demand for this vegetable in London is enormous during the summer months; indeed, overstocking the market with them is a thing that seldom, if ever, occurs. In the immediate neighbourhood of London, however, peas are not extensively cultivated, the main supplies being grown in Bedfordshire, Kent, Hertfordshire, Berkshire, and other of the home counties, where a warm soil and genial climate exist. In addition to the green peas, these sources also supply large quantities of white peas in a dry state, the latter crop being even more profitable than the growth of green peas, remunerative prices being obtained for them, while the costs of culture and marketing expenses are much less.

The first sowing for the supply of green peas is made early in January, in the driest soil and most sheltered situation available. Some growers, however, still keep up the old custom of sowing their first crop in

December, but it is questionable whether this practice is a good one, since the risk of damage by mice, birds, and damp is greater, and the January sowing yields a crop fully as early as the one made in December, so that no advantage in earliness is obtained. After the middle of January successional sowings are made every fortnight or three weeks until May, or in some cases until the end of June, but as the demand for green peas, to a great extent, ceases after the first of September, the ground occupied by these late sowings might in most instances be turned to better account. The soil for peas is prepared by being heavily manured, and deeply trenched during November or December, the surface being left as rough as possible until sowing time. A fine day is chosen in which to level the ground, mark off the rows, and draw the seed furrows, the latter being allowed to remain a day or two before the seed is sown. The distances between the rows is determined by the dwarfness or luxuriance of the varieties grown, from 2 feet 6 inches to 3 feet 6 inches being the distances usually allowed. Any partial failures in the rows, or barren spots, are planted with lettuce, cauliflowers, or other crops.

Picking the pods generally commences early in July and great attention is paid to this operation, one of the main objects being to pick off every pod sufficiently advanced, thereby sustaining the bearing properties of the plants a much longer period than would be the case, were this precaution neglected. The pods are sent to market in half-bushel baskets covered with rhubarb leaves, and secured with strong willow sticks.

Once in the market, they are bought up by the salesmen, who employ numbers of women and girls to shell them, after which the peas are sifted, the largest being kept by themselves and sold at a much higher rate than the others, which are again sifted into two sizes. For seed-producing purposes the haulm in the rows is frequently turned from side to side on the ground, this being done to preserve the pods from damp, and also to cause them all to ripen equally well. The general pea crop is cleared off the ground in August or early in September, after which white turnips are sown, or cabbage planted, as winter and spring crops.

The peas grown by market gardeners are mostly dwarf and prolific kinds, and of these each grower has his own favourite varieties. Mr. Myatt, of Deptford, prefers Beck's Little Gem to all others for early crops, and Laxton's Alpha for the general summer crop; other esteemed kinds being Early Frame, William I., and Multum in Parvo.

In addition to the home-grown supply, green peas are obtained during March and April from Algiers, Spain, and Portugal, and from France and Belgium during May and June, after which time English-grown peas come into the markets in enormous quantities; this makes it impossible for the French growers to compete advantageously with our own with fresh produce; they therefore preserve large quantities in tins, each of which holds from half a pint to a pint of peas; these are imported to England during the winter, and are sold by the London dealers at 1s. to 1s. 6d. each,

and are very acceptable at a time when green peas are unobtainable.

SEA-KALE.—This vegetable was known to the Romans, who gathered it in a wild state, and preserved it in barrels and boxes for use during long voyages. It has been used in this country from a remote period by persons, who, living near the sea, could obtain it in good condition without much trouble; its cultivation in our gardens, however, commenced at a comparatively recent date, although sea-kale is said by some writers to have been exposed for sale in English markets as far back as 1750. Sea-kale is grown in large quantities in the Fulham fields, in the Chiswick and Barnes Thames level, and in the districts around Deptford and Woolwich, in fact, in almost all market gardens round London. It is regarded as a highly remunerative crop, and is consequently one of the most important, and one that receives more than ordinary attention. Market growers have, however, a much easier method of culture than that practised by the ordinary growers, and they obtain at least double the quantity of kale from the same space of ground with less than half the amount of labour and expense. Propagation generally takes place in January, and is effected by means of cuttings of the thong-like fleshy roots of old plants that have been recently forced. These are trimmed into 4-inch lengths and spread on raised beds, which are 4 or 6 inches higher than the surrounding soil, and from 4 to 6 feet wide. The cuttings are then covered over with soil to a thickness of 2 or 3 inches, in which state they remain until planting time arrives. an opera-

tion which usually takes place in March. The beds are then uncovered, and the roots, which by this time have made several eyes, are sorted over, and all the eyes rubbed off except the top one. These plants are then placed in baskets, with their heads all one way, for the convenience of the planters, who dibble them into the ground among other crops, it being rare for land to be expressly prepared for sea-kale only. Some growers also raise it with success from seed. Mr. Myatt, at Deptford, sows his sea-kale seed on deeply trenched, unmanured ground, marked off into beds 4 feet wide, with 1-foot alleys between them. This is done in March, and, after sowing, no attention is paid to the crop during the ensuing summer and winter beyond keeping the ground clear of weeds and rubbish. In the following March the plants are lifted and the roots trimmed off, leaving only the straight tap-root with the crown on the top. These plants are considered superior to those raised from cuttings. As regards the planting and after treatment, they are all treated in the same way, whether raised from seed or otherwise. Ground intended to be occupied by sea-kale, although not expressly prepared for it, is always rich, being generally occupied with cauliflowers, spring cabbages, lettuce, and other crops, that are removed early in the summer.

Between these crops the sea-kale plants are put from 12 to 15 inches apart, by means of an iron-shod dibber, and by the time they have fairly started into growth, the other crops are removed, and they are left in full possession of the field. The ground is kept

rigidly clean between the plants during the summer, and early in November every third row is lifted for forcing, and the other remains, to be covered up 4 or 5 inches deep with soil to supply what is termed natural kale. These crowns, being little impoverished by their first year's produce, are used for the earliest batches for forcing in the following winter. Kale produced naturally usually begins to push through the ground in March or according to the warmth of the soil. In cutting, the soil is cleared away with the spade from the visible shoots, which are then cut off with a piece of the root attached and laid on the ridges, from which they are placed on their ends in large shallow baskets, trimmed, washed, and packed into punnets of a dozen heads, which are then put into hampers ready for market. Most of this work, except the cutting, is performed by women and boys. After all the crowns are cut, the ground is levelled and cropped between the rows of roots with beans, lettuces, &c.

Forcing in market gardens generally commences in November, but some always endeavour to have sea-kale fit for cutting on Lord Mayor's day; however, as a rule, this is considered too early. For forcing, the strongest and ripest crowns are always selected for each batch, the aim being to have the kale in good condition and as early in the season as possible. Market gardeners never force sea-kale in the ground where it stands, it being considered a slow and expensive process. The method they adopt is as follows:—About a week or ten days before the time arrives for the roots to be introduced to heat, pits that

have been occupied by cucumbers during the summer are cleaned out and refilled with hot dung; this is firmly trodden down and covered over with 8 or 9 inches of soil, into which the roots are inserted as thickly as possible.

A temperature of from 65° to 70° is generally aimed at, and should it get lower, additional covering is added. Thus treated, the sea-kale is fit for cutting about three weeks after planting. For cutting forced sea-kale, a small implement is used with a handle about 18 inches long, bent at the neck, and a wide blade 3 inches long, like that of a spade or Dutch hoe. For later forcing less pains are taken; a sheltered spot is chosen and formed into beds 4 or 5 feet wide, with 2-foot alleys between them; these beds are thickly planted with crowns, and the alleys, which are dug out deeply, are firmly filled with heating material, and the beds covered over in the same way as the earlier ones. By this method a long time elapses before the kale is ready for cutting, but it is a certain plan, and one by which a supply can be kept up until natural kale comes in.

On the Hampshire coast between Calshot Castle and Leap, large quantities of excellent sea-kale are obtained by merely covering the wild roots with shingle during the winter months, an operation which prevents the crowns from being trodden upon, and at the same time blanches the young leaves and stems. The crop is fit to cut in March, and is sent to the markets at Cowes and Southampton, where it readily realizes 6*d.* per pound. I have seen fresh succulent heads 9 inches in length and weighing from 16 to 20 ounces each, the

flavour being more delicate than that of kale forced by means of manure or leaves. This simple plan of culture is well worth general adoption all along our coasts where any beach exists above high-water mark. In this way, otherwise useless space may be profitably cultivated at a minimum outlay in the shape of rent and labour.

THE TOMATO, OR LOVE APPLE, has, within the last ten years, obtained a larger share of public favour than perhaps any other vegetable has been known to do in the same short space of time. It is not until recently that the merits and usefulness of the tomato have become known in English gardens, although it was introduced from America soon after its discovery, and is now extensively cultivated as a market crop, near London. In the vicinity of Naples and Rome, large fields have long been devoted to tomato culture, and this fruit is one very much used in Italian cookery. Tomatoes are sent to this country during the early summer in large wooden cases, the fruit being packed in sawdust, though often when it arrives, it is of anything but a satisfactory character. Indeed, the fruit sent in this way is always greatly inferior to that of English growth, owing to its being picked in a green state and left to ripen during transit; of all the tomatoes, however, imported into this country, none are comparable with the canned fruit of American growth.

Tomatoes are extensively grown in London market-gardens, and during warm and favourable seasons, very remunerative crops are obtained. Seeds are sown early in spring in frames set on beds of fermenting material,

on which has been placed 4 inches or 5 inches of fine rich soil. After sowing, the seed is slightly covered with soil, and receives good waterings, the sashes being kept closed until germination has taken place, unless too much steam is produced from the manure, when a little air is given night and day; after the rank heat of the manure has subsided, however, air is only admitted during mild weather. Should severe weather set in, a thick covering of straw, mats, or litter is applied every evening, this being removed early in the morning. When the plants have attained a height of 2 inches or 3 inches, they are carefully lifted, and placed two together in 6-inch pots, and are then plunged in hot-beds as before. As the weather becomes milder, more air is admitted, and towards the middle of May, the sashes are entirely removed during the day, and only replaced on cold nights and during days of bad weather. In the beginning of June, the earliest batch of plants are turned out into the most favoured positions, such as on spent mushroom ridges, fruit walls, fences, or warm borders where they are well protected.

The second or main batches of plants are obtained from seed sown a fortnight later, and under the same conditions, and are planted out in an open but warm quarter of the garden in rows 3 feet apart each way. In some cases, trenches are dug out and filled with heating material on which to place the plants. If frost is apprehended, inverted flower-pots are put over the plants during the night until they become established, and when dry weather sets in, a good mulching

of rotted manure is placed between the rows in order to keep the roots in a moist condition. As the plants advance in growth, such as are planted on mushroom ridges are trained, and those in the open are supported by strong stakes. The two strongest shoots only are left to each plant, and these are tied on the sunny side of the stakes. Every alternate lateral is removed as soon as it appears, and when several good clusters of fruit are set on the remaining shoots, the points are pinched out to induce increased bulk in the fruit. If the foliage is so thick as to exclude the light from the fruit, a portion of it is gradually removed, and the remainder turned aside to give it the full benefit of the sun, without which good coloured fruit cannot be obtained. Frequent supplies of manure water are applied to the roots of the plants when swelling their fruit, and mulching material is frequently employed with excellent results.

Although there are now many new kinds of tomatoes in existence of good quality, yet they are considered more tender than the older varieties, so that market growers cultivate only those upon which dependence can be placed, the old smooth red being the kind universally grown. The ripest fruit is picked off twice a week, but should frost appear, the whole of the crop is at once gathered and placed under glass to ripen.

Tomatoes are packed in round sieve and half-sieve baskets, and covered over with rhubarb leaves fastened down by hazel sticks. The fruit is sold by the sieve, half sieve, or dozen, and the prices vary according to

the quality of the fruit, and the time of year when it is produced. During the height of the season, good fruit may be bought for 2*d.* and 3*d.* per pound, but sometimes single fruit are sold for 6*d.* each; from 7*s.* to 12*s.* per sieve is the price usually obtained for home-grown fruit of good quality during September and October.

In addition to the vegetable crops to which I have already alluded, there are others which would well repay culture in market gardens. One of these is the "Good King Harry" or "Mercury" plant (*Chenopodium Bonus-Henricus*) so commonly met with in the cottage and farm-house gardens of Lincolnshire. Its tender young leaves, when gathered in the spring, resemble spinach. When carefully cooked, however, they are fully equal in flavour to the best asparagus. It is a robust perennial; and once planted in deep rich soil, requires no further cultural attention except a top dressing of well-decomposed manure every winter. Beet, turnips, carrots, broad, or Windsor, beans, vegetable marrows, spinach, artichokes, and salsify, are other well-known market-garden vegetables.

SALAD VEGETABLES.

CELERY is extensively cultivated near London, and especially in the Fulham fields, where it appears to do remarkably well. The plants are raised in frames, having a little bottom heat, and are gradually hardened off until, before they are finally taken from the frames, the sashes are entirely removed from them. After being well exposed in the frames, about the middle of May they are dibbled out in the open ground in lines 6 inches apart and 3 inches from plant to plant, and between every nine lines thus planted, an alley of 18 inches is left; or they are planted out in lines 9 inches apart, 4 inches asunder, and no alley is left. They are thus allowed to remain until the end of June, when a good plantation is made, the main crop being planted during the last fortnight in July. All empty ground is now dug over and marked off into 5-foot spaces by a drill or mark being made across the ground. This drill for the earlier crops is hollowed out a few inches, thus forming 4-foot beds and 1-foot alleys. In these alleys the celery is planted about 8 inches or 9 inches apart. For the later main crop, the alley is not taken out quite so deep, but just appears a little lower than the main surface. The space or 4-foot bed between the celery lines is planted with a line of cabbages along the centre about 18 inches

apart, and on both sides of this row, a row of Cos lettuces is planted. In dry weather this crop is liberally supplied with water, trenches being dug out from the banks of the Thames across the fields, and as the land is level, these trenches become filled on the rise of the tide, thus facilitating the irrigation of this and other crops. The earlier planted crops are supplied with a little soil by breaking down the sides of the ridges with a hoe. The lettuces planted between them will, by the time the celery requires a good earthing up, be ready for market, and are removed. Heads of excellent quality are always to be found in Covent Garden during the autumn; they are trimmed, washed, and tied in bundles of a dozen sticks, which sell at 1s. 6d. to 3s. per bundle.

LETTUCE is grown to a considerable extent as a catch crop between rows of other kinds of vegetables. The Bath Cos is the principal variety cultivated for winter use, and the white Paris Cos for summer and autumn. Sowings are made from August to December in heated seed beds, whence the young plants are transplanted to sheltered borders; but the spring and summer sowings are usually made in rows on the ground, where the plants are to remain until they are fit for use. When large enough, the seedlings are thinned out from 9 inches to 12 inches asunder, and in this way they do not bolt or run to seed so soon as those subjected to transplantation. Market gardeners often throw up banks of earth on which to plant winter lettuce, and by this means some of the tender kinds of cabbage lettuce will stand an ordinary winter with

impunity. In cold, wet soil this practice is especially advantageous, inasmuch as the roots are kept in a drier state than if planted on a flat surface, and the plants are sheltered from north winds and obtain full sunshine. The demand for lettuces depends very much upon the weather; in cold, wet periods they are in little request, but in warm weather they are readily sold. Lettuces are always pulled up by the roots for market, in which state they keep fresh for a longer time than they would if cut or trimmed. They are usually packed in round bushel baskets, and placed on waggons for market, where they are counted out to retail salesmen and costermongers, who dispose of immense quantities during the hot days of summer. The prices greatly depend upon the demand, but during the spring and summer the usual price is from 1s. 6d. to 2s. 6d. per dozen. There are probably few other market crops that are so remunerative as this during favourable seasons, the cost of the seed and the bringing them to market being the chief items of expenditure in their culture; they occupy but little room, and when the seed is up and thinned, no further trouble is necessary, except it be with such kinds as require tying up in order to blanch their hearts.

ENDIVE is grown to perfection in London market-gardens during the winter months, and then realizes fairly good profits, but during the summer it is so liable to run to seed that it cannot be reckoned upon as a paying crop. The first sowing is usually made in May, on light beds in frames or in a sheltered place out of doors; the plants are removed when

large enough and planted on celery ridges, and these are fit for use early in August or in September. A large sowing is made in June where the plants are to remain, and if they come up too thickly, part of them are transplanted in the open field between rows of cauliflowers or cabbages. A later sowing is made for winter use, these being protected from frost by lifting them in September and October and planting them thickly in frames or sheds, in dry soil or sand. Beyond hoeing and weeding, endive plantations receive no attention until they are fit for blanching, when the leaves are carefully gathered together and tied round with small willows, in which state they remain for a fortnight or three weeks, and are then pulled up and sent to market. The green curled and its dwarf variety are the sorts most generally grown. No provision is made for supplying endive in the spring, inasmuch as our markets being so easily supplied from France, it would not pay the English grower to attempt it. Endive fetches from 1s. to 3s. per dozen.

CHICORY is much grown as a delicate addition to winter and spring salads in London market-gardens, the seed being sown in drills 18 inches apart in the open air during the spring months; and when the plants are up, they are thinned out to 9 inches apart, and the ground is then intercropped with lettuce, endive, or other quick-growing vegetables. Deeply-trenched and fairly rich ground is always desirable for chicory culture, the aim being to obtain roots as large and strong as possible. In the autumn, when the tops have disappeared, the ground is cleared of rubbish, and

the roots are lifted as required for forcing, putting them in a dark, warm shed or mushroom house, or under the stages of cucumber-houses, where the crowns quickly burst into growth, and form white, crisp heads. Some growers sow the seed on hot-beds, and when the plants are of fairly good size, they are blanched by being covered up with mats or litter. In this case, however, the produce is not nearly so fine, nor of such good quality as that obtained from well-grown roots.

WITLOOF, OR WHITELEAF, is a name given to a vegetable recently introduced from Belgian gardens as a salad plant. It is a strong-growing variety of chicory, and the heads which it produces are as large as a good-sized lettuce. That this will eventually become an extensive market-garden crop is very probable, inasmuch as its easy culture and extreme usefulness are likely to gain for it a prominent place amongst salad vegetables, since, when well blanched, it is very crisp and tender, and has an agreeable though rather bitter flavour. In Brussels the heads are cooked whole and eaten with cream sauce, and thus served are said to be very nice and wholesome. The Brussels markets are supplied with blanched heads of witloof from Christmas until Easter, and sometimes later.

The mode of culture is as follows. The seeds are sown early in June in deep, rich soil, after which the young plants are thinned to 5 inches or 6 inches apart. From the end of October to the beginning of March, trenches are cast out 4 feet or 5 feet wide, and

from 12 inches to 16 inches deep. The plants are then lifted from the seed bed, and after having had their leaves cut off to within 2 inches of the crowns they are planted in the bottom of the trenches nearly close together, and covered over to a depth of 3 inches or 4 inches with light soil: thus the planting is finished. Forcing is accomplished in Belgium by covering the rows over 2 feet or 3 feet thick with hot stable manure, over which planks are placed to keep off heavy rains. In a month or six weeks from the time the manure is put on, the heads are fit for cutting, and they frequently measure 6 inches in height and 2 inches or 3 inches in diameter. As this vegetable becomes more generally known, it will doubtless be cultivated, as being in every way superior to chicory, or rather as the best form of that plant.

RADISHES constitute a very important crop during the winter in market gardens, the first sowing coming in early in December, the second in January, and a third in March or April. When large pieces of ground can be cleared at one time, the sowings are fewer than when only small spaces can be cropped. Four or five successional sowings are, however, about the average number. Market gardeners do not grow radishes in summer, the weather being too dry and parching for them, but in moist seasons sometimes attempts are made, and often turn out successfully. As a rule, the first sowing is made in August, if the ground be moist, and others at intervals of two or three weeks. The red turnip and salmon (a long-rooted kind) are the principal sorts grown.

Radishes are usually cultivated on ground that has been cleared of vegetable marrows, French beans, sea-kale, or celery; the autumn sowing is generally made under fruit trees when they are leafless and do not intercept the light from the plants, and before they again break into leaf in the spring, the crop is marketed. The ground to be sown is dug and manured and lined off into beds 5 feet wide, with 1-foot alleys between them; the seeds are then sown broadcast on the beds, slightly covered with soil from the alleys, and afterwards rolled. A thin covering of rank litter is then strewed over the beds until the young plants appear, when it is removed, unless the weather is frosty, in which case it is left, only to be taken off during intervals of sunshine and mild weather. All sowings are treated alike in this respect, and after February, if the plants are strong and the weather mild, covering is dispensed with, keeping a part of it in the alleys in case of emergency. Birds are the greatest enemies with which the radish grower has to contend, for they eagerly devour the seed as soon as it is sown. When the radishes become marketable, the largest are pulled first until the crop is gone; the roots are tied up into little bunches of about a dozen each with a small withe, cleanly washed, and packed into round baskets for market, where they demand a ready sale at prices varying from 9d. to 1s. 6d. per dozen bunches, according to the season and quality of the roots. A few growers make up hot-beds early in January on which to sow radishes, and roots of good quality are thus obtained, and invariably realize highly remunerative prices, owing to the

limited supply and the popularity of this root in salads.

MUSTARD AND CRESS finds a comparatively large sale in the London markets, although it is much inferior to watercress in medicinal properties, and is always plentiful when the weather is mild. This crop is so easily grown that few people who have a garden would think of buying it. Some market gardeners, however, make up hot-beds in the spring, or utilize spare room in the forcing-houses, on which to sow the seed with a view to having it early, but during the summer little is grown. It is ready for use about eight or ten days after sowing, and is cut and put into small punnets and sent to market, where it is sold for 1s. 6d. to 2s. 6d. per dozen punnets. A correspondent of the 'Gardeners' Chronicle,' Jan. 6, 1877, states that "three parts of the so-called mustard is rape, which is of milder flavour, and is moreover smooth and white in the stem, whilst mustard is hairy and does not keep so well when cut. One grower of my acquaintance pays 3l. per week on an average for punnets alone, and uses from 600 bushels to 700 bushels of seed per year."

WATERCRESS.—An immense quantity of the tender young growths of one of our commonest native water-weeds (*Nasturtium officinale*) is sold in London and other large towns under the above name, and the culture of this popular anti-scorbutic salad is a remunerative industry in the neighbourhood of London. The essentials to successful watercress culture are a good supply of pure spring water and a series of shallow sandy-bottomed beds, in which the plant can

make a clean and speedy growth. An acre of beds will produce cresses to the value of from 100*l.* to 130*l.* annually under good management; indeed, this culture and that of willows or osiers for basket-making are the most profitable methods of utilizing moist or partially inundated land. Watercress culture has long been practised on the Continent, and the quantity yearly supplied to the Paris markets has been computed by Mr. Vizetelly, as realizing 146,000*l.*, or on an average 400*l.* per diem. The fresh unbruised state in which watercress is supplied to the Paris markets is deserving of imitation by our own growers.

HORSERADISH is not a very important crop in market gardens. A few growers pay attention to its culture, and plant a portion yearly in deeply-trenched rich soil, by which means good straight sticks are obtained; but as a rule it occupies an out-of-the-way corner where it is allowed to spread and take care of itself, and, as a consequence, weak, spindling roots are produced, instead of stout, smooth sticks. During the autumn and winter months it is brought in bundles to market, the roots are trimmed of all offshoots and tied in bundles of twenty with withies, and the bottoms are then cut off level. The summer supply comes from Holland in large barrels, bunched up in the same way. English grown horseradish is sold at from 2*s.* 6*d.* to 5*s.* per bundle, which price would appear highly remunerative, but the demand being comparatively small in proportion to the supply sent from other countries, English growers seem unable to dispose of it in any quantity, especially now that the Dutch and German produce may be bought at much cheaper rates.

HERBS.

PARSLEY, MINT, SAGE, and THYME, are the principal kinds of herbs grown for general market purposes, and large fields of these and other kinds are grown for drying and distillation. Mitcham has for many years been noted for its extensive herb grounds, and from these most London herbalists derive their supplies of spearmint, peppermint, and other aromatic herbs. The latter is much used for distilling, and is planted in rows 12 inches apart each way. The plantations are kept clean throughout the summer, and in the middle of August the crop is cut for use. In the market garden, spearmint is the only kind grown, and this is used when in a green state. Small plants are put in rows a foot apart, and the ground is inter-cropped with lettuce, &c., the first year, but by the next season the mint becomes such a mass as to render this impossible, and it is then cut and bunched for market as required, the greatest demand being during the pea season. If a plantation is intended to remain permanent, a damp, rich piece of ground is desirable, and a bed once well made will last in good condition for years.

Market gardeners force mint in large quantities, sometimes one grower having as many as fifty frames occupied by it. The frames have a little fermenting

material placed in them, which is slightly covered with soil, and in this the roots are placed and protected during cold weather. Additions of manure are put round the frames, and the sashes are covered with dry litter or mats.

Sage is also an important herb crop; it is increased by rooted slips torn from the old plants, and inserted in spring, in rows 18 inches apart, and which during the first season are intercropped with parsley. Sage is bunched and sent to market according to the demand, but in Mitcham fields it is all cut and disposed of at once, or dried for winter use.

Parsley is generally sown where it is to remain, between rows of other herbs or vegetable crops, and sowings are made in succession from March to August. When the plants are up, they are thinned out by means of small hoes. Some growers protect a portion for winter supply, but as a rule this method is seldom practised in market gardens.

Thyme is usually increased by division of the old roots, these being transplanted between rows of fruit trees where the ground is solid. Common and the lemon thyme are the sorts most generally grown, and Mr. Dancer of Chiswick prefers the golden variegated sort as a better grower than the former kind.

Poppies are grown extensively at Mitcham, the seed being sown in spring, in rows 20 inches apart, and the seed heads ripen in August, when they are cut and put in bags for market.

Liquorice was formerly largely grown, but, owing to its cost of cultivation, has of late years, to a great

extent, been abandoned. It occupies the ground for three years, at the end of which time the underground stems are trenched out with great difficulty. The ground in which liquorice is intended to be planted is deeply cultivated, and heavily manured in the autumn previous to planting, and is then left in a rough state until spring, when it is levelled down. Pieces of the old roots are then taken off, about the length of one's finger, each of which contains an eye or two; these are then dibbled in drills, drawn 3 or 4 inches deep, and from 2 feet to 3 feet apart. The ground is intercropped for the first year and a half after planting, but after this time the liquorice requires all the room. When the stems are matured in the autumn of each year, they cut them off close to the ground, and a good dressing of manure is forked in between the rows. Growers of liquorice generally sell their crop as it stands in the field, the purchaser undertaking to lift it himself, an operation that entails a deal of labour, it being necessary to trench the ground over to a great depth in order to get out the roots, which sometimes get so firmly hold of the soil as to require the use of ropes wherewith to extract them.

Chamomile is also much grown at Mitcham, the double-flowered variety being preferred, on account of its giving the greatest weight of produce. In March, old plantations are broken up, and the roots divided into small pieces, which are planted in rows 2 feet apart each way, these being intercropped with lettuce during the spring. From the time the flowers begin to expand, and as long as they will yield sufficiently

to pay, they are gathered by women, who are paid either a regular day's wage, or about a penny per pound for the flowers they pluck, these being afterwards sold to chemists for medicinal purposes.

Lavender is grown by cottagers, farmers, and general herb growers, and, during the month of July, when the plants are in bloom, this district is well worth a visit; for, look which way we may, lavender is seen by acres, and the air is loaded with its fragrance. Lavender is increased by rooted slips taken from old plants, and inserted in rows in deep soil, 18 inches apart each way. The first year the produce is of little account, and therefore the ground is intercropped with parsley or lettuce. When the plants become crowded, every other one is lifted and planted 3 feet apart in other fields, thus leaving the remaining plants 3 feet apart. The land is intercropped with lettuce or cole-worts during the early part of the year, but in the summer this is not done. The flowers are harvested in August, and are usually distilled on the farm on which they are grown.

Squirting cucumbers are likewise grown for distillation, the mode of culture being similar to that adopted for vegetable marrows. The fruits are gathered before they are ripe, otherwise they would burst in the operation. Other kinds of herbs are also grown under similar conditions to the above, and are sold in the markets at from 2*d.* to 4*d.* per bunch.

DECORATIVE PLANT CULTURE.

VISITORS to Covent Garden and other great London flower-markets, and those who are in the habit of seeing the numberless hawkers' barrows laden with plants that daily parade the streets, must doubtless have many times wondered whence such countless myriads of beautiful plants come so regularly at all seasons of the year. If, however, those who are astonished at this, could have a peep at some of our immense, though almost secluded, suburban plant factories, they would wonder no longer, except it might be, as to where the innumerable hosts of plants of all sizes and varieties contained in such places are disposed of. Everyone is of course acquainted with the numerous small florist establishments, with their dozen or more small houses, in which are grown bedding plants wherewith to deck the gardens of the suburban villas, as these usually occupy prominent positions in important thoroughfares, where they can be readily seen by passers-by, but comparatively few are acquainted with our large plant depôts, in which goods are manufactured wholly for market.

This branch of gardening industry has been wonderfully developed during the last twenty years, and an immense amount of labour and capital has been devoted to the culture of ornamental plants in small pots suitable for sitting-room or window decoration, and also to the production of choice cut flowers of various kinds,

from the choicest of tropical orchids, to the old-fashioned narcissus and snowdrops of our gardens. These are used in the formation of wreaths and bouquets, or for drawing-room vases, and the floral dinner-table ornaments which have in recent years been so popular. Special cultivators have taken up the wholesale production of decorative pot-plants so intelligently and systematically, that not only do they supply the retail florists' shops in town, but even our large nurserymen find it more advantageous to purchase plants for ordinary purposes of indoor decoration from these specialists than to grow them themselves. In ordinary commercial plant establishments or nurseries, the rule is to keep a large selection of ornamental plants, but in many of the modern gardens wherein decorative plants are grown to supply our flower markets, only a few sorts of plants are cultivated, in some cases not more than a dozen, these being, however, grown by the thousand; and in this manner better results are obtained at much less expense for labour and fire heat, than under the old mixed system of plant culture.

Some years ago immense profits were made by plant growers for markets, but competition in this branch of industry, as in those of vegetables and fruits, has done much to reduce these; at the present time, as a rule, but little more is made than a fair return for the capital and labour expended, and further competition in this field is not likely to be successful unless some fresh line of culture is adopted, or some striking novelty introduced into the market. In this branch of

gardening, the capital expended varies from 100*l.* to as much as 2000*l.* and even 5000*l.* per acre, and the profits are equally variable. Where capital is put into the trade in the form of substantial hot-houses, heating apparatus, and conveniences for packing and transport, and where choice plants only are grown, the profits are very high, that is, much higher in proportion than when ordinary appliances are at work and more common plants grown.

Through the kindness of Mr. Beckwith, of Tottenham, I was the other day allowed to inspect one of these important plant-growing factories. There are no elaborately painted sign-boards, nor direction posts here to make known to the stranger the name of the proprietor, and the character of his wares, for, as a rule, visitors to such places are certainly more a hindrance than a help to business. It consists of several acres of ground, which are for the most part covered with glass, there being forty-two houses, besides immense ranges of pits, frames, &c. None of the houses are by any means small; on the contrary, many of them are of large dimensions, measuring from 100 feet to 250 feet in length, and proportionately wide. Their construction is very simple indeed: they are chiefly span-roofed without rafters, the sashes in which the glass is laid being of iron, and placed at such distances apart as to admit a pane of glass from 18 inches to 2 feet in width. Indeed, every ray of light that it is possible to admit to the occupants is taken advantage of, and to this may be attributed to some extent the marvellous results in the way of

culture obtained here. The heating apparatus alone consists of seven powerful horizontal tubular boilers, each of which measures from 10 feet to 12 feet long, and 6 feet to 8 feet wide, and weighs 9 tons. They were made from plans furnished by Mr. Beckwith. To these are attached something like 7 miles of 4-inch piping, and in ordinarily mild seasons they consume 600 chaldrons of coke, and 250 tons of coal, besides an enormous quantity of breeze or small coal. A system of order and regularity prevails throughout the whole place, each class of plants being kept together in the department devoted to them.

Each hand employed on the place has his regular work allotted to him, so that he always knows what to do and when to do it. Between thirty and forty men are employed in this establishment, and their employer has an excellent rule to which he strictly adheres, viz. that of securing good workmen, paying them liberally, and keeping them as long in his service as he possibly can. Frequent changes in such establishments are very inconvenient, as new hands take a long time to become acquainted with the work.

Nearly all plant growers for market have something of which they make a speciality, and Mr. Beckwith's is pelargoniums, which are admirably grown. Of show and fancy kinds from 80,000 to 90,000 are sent to market yearly, and of what are called zonals, in proportion. The plants of the show and fancy kinds are struck in the spring, as early as cuttings can be obtained, and potted on till they occupy 48-sized or 32-sized pots. They are subjected to gentle warmth, and

abundance of air night and day when the weather will permit, and are copiously watered daily. The only kind of stimulant used in this great plant factory—for such it may be called—is soot-water, which is applied of different strengths, according to the different stages in which the plants may be. This has the effect of dispelling worms from the soil, and imparting to the foliage a dark green, healthy-looking colour. Few of them exceed 6 inches in height, but they are wonderfully shrubby and are thickly clothed with foliage down to the pot, and every point is set with fine, plump bloom-buds. The scarlet-flowering section is grown chiefly for the trade, as are also heliotropes. Propagation is actively carried on from October to March. The plants sold to the trade are rooted in shallow wooden boxes, in which the cuttings are placed as thickly as possible, and in this state, after having been hardened off, they are sent away to customers.

Bulbs also occupy a very important position in this establishment, especially hyacinths and tulips. Of the former between 60,000 and 70,000 are forced yearly. They are potted in the autumn in 32-sized pots, and placed in square beds out of doors, and thickly covered with cocoanut fibre; this, being light can easily be removed to pick out the most forward bulbs from time to time, as they are required for forcing. Mr. Beckwith always contrives to send twenty dozen pots of hyacinths to market the day before Christmas. Tulip bulbs are placed in shallow boxes, in which they remain until flower-buds can be

seen, when they are lifted and potted four or five in 48-sized or 32-sized pots, using good sandy loam for the purpose. The single Duc Van Thol is the principal variety grown. Another market grower, Mr. Reeves, of Acton, imports and grows yearly as many as 160,000 tulip bulbs. Lily of the valley, too, is extensively cultivated here, as are likewise narcissi, of which many hundreds may be seen in bloom. Lily of the valley is plunged in a warm house in cocoanut fibre, and covered to a thickness of 6 or 8 inches. When the flower-spikes are found to be pushing, the covering is gradually removed. The roots to supply flowers are all imported, but those to furnish foliage are such as can be obtained out of doors everywhere. Lily of the valley is chiefly grown for cutting for button-holes, &c.

A whole house here is devoted to the culture of double white primulas for furnishing cut blooms, and the plants, being treated to plenty of heat and water, yield a supply nearly all the year round. Cyclamens are also grown here, but not in such quantities as other things, fine flowering plants of them of marketable size being produced from seed sown ten months previously. Mr. Smith, of Ealing Dean Nursery, makes a speciality of cyclamen culture, and yearly sends 10,000 or more to Covent Garden and other markets. A very large house is devoted to the culture of poinsettias, and a more brilliant sight than they present when in bloom can scarcely be imagined, thousands of large scarlet bracts being open at one time. These plants are grown in 48-sized pots, are

about 12 or 15 inches high, and well clothed with large green foliage from top to bottom. In addition to these, several thousand solanums are grown, 10,000 *Begonia Weltoniensis*, 12,000 cinerarias, and as many fuchsias. Some growers devote themselves to mignonette, heliotrope, hydrangeas, and asters, while others make a speciality of white arum lilies (*Richardia Ethiopica*), pelargoniums, fuchsias, and perhaps Chinese primulas or cinerarias.

The cut-flower trade is generally carried on as a part of the plant growing for market business, but there are some cultivators who make this a speciality. Thus Mr. Ladds, of Bexley Heath, has immense ranges of glass houses devoted to the production of tea rosebuds, gardenias, stephanotis, eucharis, and other flowers; and Mr. John Wills, the most extensive floral decorator which we have in London, has a well-regulated establishment at Fulham especially devoted to the culture of orchids, tuberose, bulbous plants, eucharis, and other fragrant and beautiful flowers. Scarcely any flower is out of season in establishments like those just named; thus Mr. Ladds can provide the most lovely pink, white, buff, and salmon-coloured tea rosebuds and gardenias every day in the year, not merely an odd dozen or two of flowers, but generally in a wholesale way, by the thousand; and one rarely visits Mr. Wills' floral depôt without finding fragrant jasmine and mignonette, pearly stephanotis and gardenias, lily-like eucharis or tuberose in abundance, and, with them for garniture, the most delicate of grasses, the filmy spray of exotic asparagus, and climbing fern, or the

elegant glossy leaved myrsiphyllum, which has been for years a favourite in America, but has only recently been introduced to favour in this country.

Apart from the cheap decorative plants, we have a host of rare tropical orchids, palms, ferns, and other fine foliaged plants which realize high prices, from



PITCHER PLANT (*Nepenthes Rafflesiana*).

a guinea upwards, according to their rarity and beauty. Among the more choice kinds of decorative exotics, the singular pitcher plants are deserving of especial notice, as being highly curious, and at the same

time extremely variable in form and colour. The engraving represents one of the most showy of the cultivated kinds, its pitchers being often 6 inches in length and of a light green colour blotched with purple. The most beautiful species are natives of the Malayan islands, whence it is to be hoped they will ere long find their way to our shores.

COVENT GARDEN MARKET.

THIS well-known market has not inaptly been described as "the best garden in the world," and so far as gardening produce is concerned, it is sufficiently near the truth for all the practical purposes of argument. Previous, however, to noting the products of horticultural interest and industry which find their way to this great centre, which I select as the type of other London markets for the sale of garden produce, I will glance at the early history of Covent—or, as it used to be, Convent—Garden itself. The name gives us a clue to its former use and character.

Previous to the Reformation the property belonged to "ye monkes of Westeminster," and formed the garden and burial-ground of their convent; but when the memorable ecclesiastical changes of the sixteenth century took place, this property came into the possession of Edward Seymour, Duke of Somerset, brother-in-law to Henry VIII., and subsequently Protector in the time of Edward VI. This was at a time when men's heads were lopped off with nearly as little ceremony as one now prunes trees; and the Duke being beheaded in 1552, the grant of the Convent Garden came into the possession of John, Duke of Bedford, together "with seven acres of land called

Longacre, of the yearly value of 6*l.* 6*s.* 8*d.*” And the same records tell us, that the Earl built himself a timber mansion in the same year on the site of Southampton Street, with a garden that ran down to the Strond or Strand, with an entrance from the latter thoroughfare, leaving the rest of the property unoccupied. Another great statesman of the time, Sir William Cecil, Secretary of State to Elizabeth, lived in a house on the north side of the Strand, and rented a portion of the pasture of the Convent Garden, and also an orchard from the Earl, for the yearly rental of 5*s.* This case is printed in the ‘*Archæologia*’ (vol. xxx. p. 497), from which I quote the description of the land.

“That the said Earle of Bedforde, for the goodwill he beareth to the said Sr. Willm. Cecill, hath demysed, graunted, and to firme letton, and by these presentes dothe demyse, graunte, and to ferme lett unto the said Sr. Willm. Cecill, all that his porcyon or percell of grounde lyenge in the east ende, and being percell of the enclosure or pasture communely called Covent Garden, soituat in Westm’, which porcyon the said Sr. Willm. Cecill doeth and of late yeares hath occupied at the sufferance of the said Earle, and hath bene and ys nowe devyded from the rest of the said enclosure called Covent Garden on the west syde of the said porcyon or p’cell nowe demysed wth certayne stulpes and rayles of wood, and is fensed wth a wall of muddle or earthe on the east next unto the comune high waye that leadeth from Stronde to St. Gyles-it-the fyeldes, and on the west end towards the south is

fensed wth the orcharde wall of the said Sr. Willm. Cecyll, and on the south end wth a certayne fence wall of mudde or earthe, beinge therbye devyded from certayne gardens belonging to the inne called the Whyte Heart and other tenementes situate in the high streate of Westm., communely called the Stronde."

The market itself originated in a few temporary stalls or sheds, which grew up under the shadow of the garden wall of Bedford House. The squatters who held these stalls seem to have been recognized in 1656, as at that date the churchwardens of the parish made payment as follows: "21 March. Paid 4s. 3d. to the painter for painting the benches and seates in the Market-place." In 1671 the Earl of Bedford obtained a patent for this market, and eight years afterwards it was rated to the poor for the first time, when there were twenty-three salesmen, severally rated at 2s. and 1s.

The above extracts will give my readers an idea of the value of property in London two or three centuries ago. The market has gone through repeated changes during the past two hundred years, and although at the present sadly deficient in accommodation, is the centre to which the finest fruit, flowers, and vegetables are brought, previous to their finding their way to the consumer's table. Three mornings every week, the garden is crowded to overflowing with produce, and the surrounding streets are completely blocked with waggons, vans, and the barrows of the smaller dealers. At present the market consists of a square of whole-sale shops or salesmen's warehouses, this square being

divided into two parallelograms by the "central row," or "avenue," of retail shops, and it is here that the choicest products of the gardener are to be found at all seasons.

In the heat of the summer fruit season Covent Garden, of all others, is the centre of an ever-increasing trade in fruits, vegetables, and flowers. Seeing that we are a meat-eating rather than a fruit-eating people, it is a matter of some surprise to find the imports of fruit and vegetables increasing year by year as they do. Doubtless an increasing population has something to do with this demand and supply, and the lethargy of our own growers fosters the introduction of foreign supplies, which, year by year, are gradually but surely lowering the prices of all home-grown produce, if we except the very finest, earliest, or latest samples. The market salesmen also foster the introduction of foreign fruit, because it enables them to be to a great extent independent of the fruit grower here at home, and hence he is obliged to take low prices for all but the very best of his produce. Many of the market gardeners near London left tons of plums to fall and rot on the ground in 1875, because the market was glutted with foreign fruit, and the prices offered would not pay for picking and carriage; and it has since been the same with strawberries.

There ought to be some plan adopted of preventing the enormous waste of fruit which takes place nearly every fruitful year in our market gardens, and in this respect we might take a lesson from our French and American neighbours. Nearly all the finer kinds of

candied and crystallized fruits are sent here from the Continent, and, being neatly packed in tasteful fancy boxes, good profits are obtained both by fruit growers, preservers, and packers. In America, again, canned fruits and vegetables represent an enormous labour and capital account, and excellent prices are obtained for superabundant produce. In all large fruit-growing districts, a well-managed establishment for canning, preserving, bottling, candying, and crystallizing fruits would prove a remunerative speculation; and the establishment of such an industry close to the large fruit-growing centres would enable the grower to obtain better prices than is now frequently the case, since the London fruit-salesmen would have to compete with the fruit-preserving establishments, instead of supplying them as they now do in many cases, and the consequence is, that too much fruit is eaten at one part of the year, and too little or none at another. Well-preserved fruits can wait for sale, but fresh fruit must be sold at an hour's notice just for what it will fetch in the market. As pointed out in the 'Gardener' a month or two ago, the profits of the middlemen or salesmen are very large—so large, indeed, as to keep really fine fruit out of the reach of all but the most wealthy; and this will ever be so until our large fruit-growers deal more directly with the public, either by employing salesmen of their own, or by erecting fruit-preserving apparatus either in or near their grounds. Considering that many tons of vile, fictitious compounds are yearly sold as fruit-syrups and "family jam," surely any quantity of genuine preserved fruits

could be sold in this country at a good price; and if these were used as black-currant jam is used during the winter months in Yorkshire and Lancashire—as a substitute for butter—no harm will be done, especially if it be substituted for the greasy rubbish now sold as butter in the cheap shops of most large towns.

The culture and conservation of our hardy fruit crops represent such a vast amount of food, labour, and national as well as individual wealth, that one can only wonder that so little is being done by home growers to rival the produce now so largely imported from other countries, or at all events to make the best of that grown by themselves. It is clear that ere long the price of home-grown fruit will be even more considerably lowered than at present, as the importations from the Continent and the Channel Islands increase; nor is the fact much to be lamented, seeing that the cheaper good fruit becomes, the better; for of all food for the hot summer months, perhaps perfectly ripe and fresh fruit is the best, either as gathered from the trees, or when properly cooked. Were the gardener to heap fuel on his boiler fires during the hot summer weather, he would be deemed little better than a lunatic; but there are thousands who keep the human furnace fires at full blast with the same amount of heat-producing food, no matter what the climate may be around them.

The importation of foreign fruits to this country influences to a considerable extent the market value of home-grown produce. Indeed, such imports as now

find their way to Covent Garden alone, form no inconsiderable proportion of the gross supply of the market. The fact is, we are not a fruit-growing people, and on that account the demand for that kind of produce is greater than the home-grown supply; hence, recourse to foreign sources has been had as the only means of enabling dealers to satisfy the demands made upon them; and the plan adopted in the beginning to meet an emergency in one or two special cases (early strawberries for example), has now become universal, and is productive of excellent results. Whatever tends to cheapen fruit and to bring it within the reach of the masses, is deserving of support, and this the foreign trade has already done. Grapes, melons, pines, and other fruits of warmer latitudes than our own, have been brought within the reach of every artisan who cares to eat them, and the probability is that ere long imported fruit will be still cheaper. It is scarcely likely that the health of the public will be worse in consequence of this, for physiologists tell us that good fruit is highly desirable as food at all seasons, and one cannot but believe that a cluster of luscious grapes or a good pear is at least as likely to quench thirst under a broiling sun, as the questionable beverages usually consumed on a summer's day with that intention. Although we are a nation of beef-eaters by birth, yet a taste for fruit is rapidly extending amongst all classes, and the proof of this is that our home-grown supplies are insufficient to meet our demands.

As a rule, in the month of December, oranges

come in very largely, and usually sell at remarkably low rates. These are imported from St. Michael, Lisbon, Valencia, Messina, and Palermo. Lemons are also very plentiful, and come principally from Malaga, Messina, Palermo, and Alexandria, packed in long flat or round-topped cases of lath or thin boards, the packing material consisting of Indian corn or maize husks. The first importations generally arrive about September or October, and are characterized by their acidity, pale colour, and small size. Later on in the season finer and better ripened fruit makes its appearance; but, notwithstanding the present speed of transport, we seldom obtain fruit with that luscious and agreeably perfumed flavour that distinguishes lemons when plucked ripe and eaten off the tree. Like all other cultivated fruits, the orange (*Citrus aurantium*) sports into numerous varieties; indeed, this must have occurred to all who buy the fruit in this country. The differences chiefly consist in size, colour of rind or flesh, thickness of the skin or rind, sweetness, and time of ripening.

Among the excellencies of the orange as an imported fruit, are its keeping qualities; indeed, it is a fruit nearly always cheap, and readily obtainable almost all the year round. Apart from those eaten as imported, many thousands of cases are annually manufactured into marmalade and also into wine. The best marmalade is that prepared from rind of the bitter or Seville orange; but fruits of all sorts are used for the commoner and cheaper preparations of this agreeable conserve.

Among the many distinct varieties brought to

Covent Garden Market is the blood orange, which in external appearance resembles the St. Michael's, but the pulp is of a deep crimson tint, and not yellow as in ordinary kinds. The little Tangierine is deservedly popular, its flavour being most delicious. It is readily known by its small size, and flattened or oblate form, while its skin or rind is very brittle and delicately perfumed. Citrons are oblong or rounded, with a remarkably rough skin; indeed, in general appearance they most resemble gigantic lemons. The shaddock (Forbidden Fruit) and pomeloes are large and highly ornamental forms of citron, and of little use except for conserves or marmalade. Among the rarer forms of the Citrus family, I may mention the pretty little egg-shaped Chinese orange (*Citrus japonica*), home-grown fruit of which makes its appearance at rare intervals. This variety is characterized by its bitter pulp and sweet lightly perfumed rind, the latter being of extraordinary thickness as compared with the size of the fruit. Under the name of "kumquats" or "coumquats," this fruit is now commonly imported in a preserved state, and large jars of it may be purchased at about 6s. or 7s. each, or at about 1s. per pound retail.

The orange is perhaps the oldest of our imported fruits, the trade in which of late years has increased with great rapidity. The orange is a native of the East, and is said to have been introduced to Portugal from China in 1547, while at the present time "they fill the warmer provinces of the Iberian peninsula with their vegetable gold; they shine all along the

sunny nooks of the Riviera; Corsica, Sardinia, Sicily, and southern Italy are gilded with them, and all along the north coast of Africa to Egypt and the Levant they form an important crop." Orange culture promises to form a lucrative industry in California, and in the warmer of the United States, whence excellent samples already reach our markets. Upwards of 2,000,000 bushels of this fruit are sent to this country annually, of which about 300,000 boxes, each holding about 400 fruits, come from St. Michael and the adjacent islets.

Amongst the most important of all the recently imported fruits, however, are grapes, a fruit long restricted to the tables of the wealthier classes; but excellent grapes may now be purchased in Covent Garden, from August to January or February, at prices varying from 6*d.* to 1*s.* per pound. Grapes are imported from Holland, Spain, Portugal, Germany, France, and the Channel Islands. The best kinds are the Dutch, and German or Hamburg grapes, which arrive about October in considerable abundance. These are equal to home-grown fruit in appearance, and are much lower in price, the average prices ranging from 9*d.* to 1*s.* per pound. The flavour is not so good as that of home-grown fruit, but by some they are liked even better, on account of their pleasant acidity. These grapes come packed in round baskets or hampers 16 inches in diameter, each containing from 10 lb. to 15 lb., and in a plentiful season these baskets may be bought from 7*s.* to 10*s.* each.

The most noticeable feature in connection with these

is the system of packing adopted by the growers. No packing material of any kind is used, the fruit being carefully gathered during dry sunny weather, and placed at once in these baskets, which are gently shaken and filled, so that the cover, when fastened down securely, presses firmly on the fruit. I have seen fruit packed in this manner turned out as fresh here in the London markets as if just gathered; and the hint is well worth general application by gardeners when packing fruit of home growth; for it is a noticeable fact, that much of the fruit sent to Covent Garden by grape growers in England is completely spoiled in appearance through being swaddled in cotton-wool or paper, whereas, if pressed firmly in baskets or cases, but little of the bloom is lost.

The delicious little amber-berried Chasselas de Fontainebleau (Royal Muscadine), so common in the fruit markets of Paris, is, unfortunately, but rarely seen in Covent Garden. These are packed tightly in small oblong boxes, and bear carriage well; but the retail dealers do not care for them, because they do not keep well, and must consequently be sold on arrival for just whatever they will fetch. These grapes are sold from 7*d.* to 10*d.* per kilo. (about 2 lb. English) in the French markets, or even cheaper by the box of 8 lb. or 10 lb. Within the last few years a kind of muscadine, very similar to the Royal Muscadine in appearance, has been imported from Lisbon and other parts of both Portugal and Spain. These are very sweet and juicy, and keep for several weeks without injury. They are imported in boxes, and sell at prices varying from 4*d.* to 1*s.* per pound retail, and

much cheaper by the box or at auction sales. In size and flavour these are fully equal, and in many cases superior, to muscadines of home growth. These come in before the Hamburgs, or "grocers' grapes," as they are called by the trade, and last until the Almerian fruit arrives in November. A large red or purple-skinned grape is imported in limited quantities from Lisbon, and is of excellent quality, the flesh being firm and juicy. It keeps well, but the berries fall from the stalks, which are very brittle, like the "Aramon," a French wine grape, which it in some respects resembles. The white Almerian grape carries on the supply from November until March, or even later; but it is a thick-skinned and insipid flavoured variety, with nothing but its long-keeping qualification to recommend it. This grape is known in some English collections as "Bowker," but is not worth room in a house, being of a coarse habit in every respect. It is, however, worth a trial as a stock for the late-keeping kinds, as White Lady Downes, Mrs. Pince, Black Muscat, and others. Almerian grapes will keep fresh and good for six months after being cut from the vines, if suspended in a cool, airy place. Excellent samples of Gros Colman grapes are now sent to Covent Garden market during December by the Jersey growers, who can grow good grapes with but little fire heat, and at less expense than English cultivators, who will henceforth have to compete with their neighbours in the production of choice fruit, so that lower prices generally are sure to be the result.

Foreign peaches are rather limited in supply, but

during the last year or two a few excellent samples have been sent by the Montreuil growers in very fine condition. The excellence of the French peaches is well known, and, as well-packed cases may be despatched from Paris at four o'clock P.M. and arrive in London by 10 or 12 A.M. the following morning, there is no reason why this luscious fruit should not be largely sent to us by French growers. During the past year a few samples of yellow-fleshed peaches have arrived from America, but these are of second-rate quality, and much cannot be expected of this most delicate of all fruits after a ten or twelve days' voyage, and the not over-careful handling to which it is subjected. We must look to France and the Channel Islands for any additional supply of peaches, as the climate and transport arrangements are well-nigh perfect for all the purposes of culture and importation. A few nectarines also come from France, generally packed in small deal boxes, and these sell at from 2s. to 3s. the box.

Green or fresh figs are more plentiful than formerly, the principal source of supply being the sunny south of France, while considerable quantities also come from Guernsey, and some from Jersey. The supply of these is also supplemented by a few choice samples grown in our hot-houses at home, these, as a rule, being the best-flavoured fruit. During the hot autumn months, however, the main supply of green or fresh figs comes in from the old monastic fig orchards at Worthing. These orchards are said to have been established by Thomas-à-Becket on his return from

Italy; but be this as it may, the present trees are not over one hundred years old. One orchard at Tarring contains one hundred and twenty large standard trees, from which in a good season two thousand dozens of fruit have been gathered. The umbrageous shade of these fine trees, and the luscious purple-black nectar-distilling fruits, are luxuries which can nowhere be obtained with more comfort than in the sunny orchards of Sussex.

Melons come from Lisbon, Cadiz, and from many of the ports of the Mediterranean, the Cadiz or greenflesh melon being often of very excellent quality, notwithstanding that the fruit must necessarily be gathered and packed before it attains that precise period of luscious ripeness, which renders it so acceptable in most tropical and sub-tropical climates. The true water melon is rarely seen in our markets, although it is common enough in the ports of the Mediterranean, and bears carriage well. This is larger than the Cadiz melon, and of a fresher green colour outside, while the crystalline, melting flesh is of a delicate rose or salmon colour, and in this the jet-black seeds are firmly imbedded. In hot weather this is a delicious fruit, and I should like to see it imported more largely than is now the case. The small brown densely netted musk melon occasionally makes its appearance, but the main demand is still supplied by Portuguese and home-grown fruit.

Apples are now largely imported from America, the Newtown pippin being an especial favourite here. These are packed in barrels, each holding from two

to three bushels. No packing materials are used, but the lid is pressed down tightly, and this securely protects the fruit from friction. These apples are especially grown in New York state for exportation to this country, where in December and January they realize 30s. to 40s. per barrel. Further particulars on the American apple crop will be given in the chapter on Gardening Industry Abroad; but I may here notice the splendid fruit sent to Covent Garden market from France, of such varieties as Calville Blanc, Reinette de Canada, Court Pendu Plat; excellent samples of Brabant Bellefleur also come from Holland and Belgium.

Pears come principally from France, the Channel Islands, and from Germany and Holland; the favourite varieties are Jargonelle, William's Bon Crétien, Marie Louise, Duchesse d'Angoulême, Beurré Clairgeau, Louise Bonne of Jersey, and two or three other well-known standard varieties. These come packed securely in wooden cases, twenty to seventy fruits in a case, and suffer very little in transit. The enormous specimens of Beurré Clairgeau and Belle Angevine (Uvedale's St. Germain), so often seen exhibited at fancy prices in our fruiterers' windows, come from Jersey and Guernsey, and, apart from their monstrous size and high colour, have little to recommend them. The highest prices are realized in the market by growers of late-keeping or winter pears, such as Josephine de Malines, Bon Curé, and Easter Beurré, and a large proportion of these are imported from continental gardens. In the winter of 1875, however, an excellent

consignment of Easter Beurré pears was received from California, and were readily sold at 8s. to 10s. per dozen retail. Henceforth, therefore, continental fruit growers, to whom we pay thousands of pounds annually for pears alone, will have to compete with the growers of the Western States of America, who have cheap land and moderate transit charges, and one of the best of all climates for choice late pears, which are likely to keep and travel better, owing to their having been ripened in a drier and more sunny climate than even that of southern Europe.

Among the rarer fruits which are from time to time imported to Covent Garden, I may instance prickly pears, the fruit of a cactus (*Opuntia vulgaris* and other species); pomegranates, the pulp of which is delicious eaten with port wine and sugar; West Indian custard apples, the fruit of *Anona squamosa* and *A. reticulata*.

Bananas are largely introduced from the West Indian islands, some of the clusters weighing seventy and eighty pounds each. When thoroughly ripe, the flavour of the best kinds of bananas is simply delicious, but this is deteriorated in imported fruit, as it has to be cut from the plant before it is ripe. The fruit is produced by *Musa Cavendishii* and *M. sapientum*, both of which are largely cultivated in most tropical countries and used as common articles of food by the natives.

Litchees are now brought from China, and are sold here at from 3s. to 4s. per pound. These are the fruit of *Nephelium litchi*, one of the most popular of all imported fruits, not even excepting the apricot.

The round variety is most common, and has a thin shell of a reddish-brown colour covered with rough warts. The pulp, when fresh, is sweet and jelly-like, but, as imported in a dried state, it may be likened to that of French dried plums or prunes; one of the most peculiar characteristics of this fruit is its extreme lightness.

The loquat, or Japanese medlar, another Chinese and Japanese fruit, is sometimes imported. This fruit is produced by *Eriobotrya japonica*, a small evergreen tree, sometimes grown as a foliage shrub in this country. The fruit is borne in clusters, each being about the size of a pigeon's egg, and of a delicate yellow colour suffused with rose when fully ripe, and possessing a delicate and agreeable sub-acid flavour.

American peanuts, as the fruit pods of *Arachis hypogynæa* are called, are far from uncommon, and are easily known by the two seeded pods being beautifully netted, so that they resemble little wicker baskets. This plant is a native of the Cape, but is now widely distributed in most tropical and intertropical countries. A striking peculiarity possessed by this plant is, that after flowering, the penduncles bend down and thrust the young fruit into the soil to ripen—hence one of the essential conditions necessary to its growth is a light open soil. These nuts, slightly roasted, are sold in American theatres as extensively as oranges are in London. A valuable oil is also extracted from them in considerable quantities.

Brazil nuts and Sapuacia nuts are both produced by

species of lecythis, natives of the forests of Guiana and Brazil. The last named are by far the best in quality, and are principally imported from Para. The so-called nuts, when growing, are enclosed in urn-shaped receptacles, popularly known as "monkey pots;" these are, however, seldom imported, the nuts being taken out and packed in bags and boxes for shipment.

Cocoa-nuts come in considerable quantities from the West Indian islands and other parts of the tropics, throughout which the cocoa-nut palm (*Cocos nucifera*) is grown as one of the most valuable of all vegetable products. In their original state the nuts are covered with a thick triangular covering of fibrous and cellular matter, that bears some analogy to the husk of a walnut, but this is stripped off to lessen their bulk previous to their being packed for shipment.

Among the most notable branch of the fruit trade opened up of late years, that of imported pines deserves attention. Hitherto only a few experienced growers have succeeded in making this a paying crop for market purposes, and it is a common saying that "a house of cucumbers will buy a horse, before pines will purchase a saddle," and this is something near the truth.

The best of the imported pine-apples now come from St. Michael, where they are grown in houses and pots in a similar manner to that employed here at home, only that the more southern cultivator has the advantage of a tropical sun and is enabled to dispense with artificial heat. These pines arrive in splendid condition, and

during the winter months the dealers like them better than those of home growth. They equal the best English fruit in appearance, and are considered of superior flavour, with less tendency to be false or rotten at the core. The fruit are brought over by whole cargoes at a time, and fetch remunerative prices under the hammer. The variety most largely grown in St. Michael is the Smooth-leaved Cayenne, but some growers are including Queens and Charlotte Rothschild, a very handsome and large-fruited variety, among their plants. Home-grown pines of good quality formerly fetched from one to five guineas each in Covent Garden, but since the advent of imported fruit, market-growers and many private gentlemen have relinquished pine culture and now grow grapes instead.

The first St. Michael pines imported to this country arrived in 1867, and were brought over on the plants. These were sold by auction, and fifty fruits realized about 75*l*. Exceptionally fine fruit, 7 lb. to 8 lb. in weight, are now worth from 30*s*. to 40*s*. each, but inferior fruit may be bought much cheaper. Common West Indian pines are imported in large quantities about April and May, and are principally used for preserving. These fruits have also been of much better quality during the past year or two, and fetch from 1*s*. to 5*s*. each, but may be obtained much cheaper.

The very remunerative prices realized by St. Michael pine-apples during the years 1867 to 1873 inclusive, led to the investment of a large amount of capital for the purpose of growing these fruits for

exportation to Europe; and at the present time glass-roofed pine-houses, where, without any artificial heat, from 100 to 300 fruits can be grown every year, are numerous, while there are many estugas, as they are called, in sheltered positions around the harbour, each capable of producing 500 fruits. One cultivator has invested 4000*l.*, and a company has also put up erections for pine-apple culture at an equal cost. In some cases money has been borrowed at the rate of 8*l.* to 10*l.* per cent. for the purpose of speculating in this branch of horticultural industry, and many little capitalists who own an acre or two of land have also commenced growing and exporting these fruits.

Two estugas, in each of which 500 fruits can be grown, can be erected at a cost of 1000*l.*, each plant occupying a space of about 40 inches square, or say a yard and a quarter superficial measure. The earth in which the plants are grown consists of rich humus, or vegetable matter, which is collected in the mountains, and is brought long distances in panniers borne by mules and donkeys. The cost of growing, packing, and carriage of each fruit to the auction rooms in London is about 5*s.*, and as the prices realized recently have not been nearly so remunerative as formerly, considerable dissatisfaction has been felt by the growers, who have, in part, appointed a salesman in London to sell their fruit to the consumers in a more direct manner than has hitherto been the case. To this end an office has been taken, and the growers have, in part, signed an agreement to send their fruit, amounting to 20,700, to this office for sale. Some

idea as to the importance of this industry may be gathered from the following return compiled by the Director of Customs at Ponta Delgada, St. Michael.

OFFICIAL RETURNS OF PINE-APPLES EXPORTED FROM
ST. MICHAEL, AZORES.

Season.	No. of Fruit.
1867-8	427
1868-9	478
1869-70	958
1870-1	1,045
1871-2	2,457
1872-3	2,491
1873-4	6,429
1874-5	10,893
1875-6	34,524

It will be seen that the imports to this country, which in 1867-8 were only 427 fruit, have increased in 1875-6 to 34,524, and in all probability, judging from the preparations being made, the numbers in 1876-7 will reach 50,000. These facts show pretty plainly the reason why prices have fallen; and unless the pine growers of St. Michael are content either to grow a more moderate number of fruit, or else, like the Dutch cultivators on the Spice Islands, destroy part of their produce, or preserve it in syrup for exportation, prices will soon become unremunerative, and a very interesting branch of gardening industry will be discontinued; especially if the report be true, that some of the vine cultivators in Madeira, who have suffered from the ravages of phylloxera, are turning their attention to pine-apple culture for exportation.

Immense quantities of pine-apples are grown in the

Bahamas, and the culture is still rapidly extending through the islands. The value of the fruit shipped to England and the United States of America in 1873 was 55,497*l*.

At Nassau an establishment for the conservation of pine-apples by canning was established in 1874, at a cost of 200,000*l*., and upwards of 600 hands are employed in clearing and preparing the fruit, apart from those engaged in cultural operations. About one million fruits were canned the first season, only perfectly ripe and good fruit being used. The fruit is purchased by agents direct from the growers, at prices varying from 2*s*. to 3*s*. per dozen, the tins or cans being imported at about the same cost.

It is astonishing how many kinds of fruit might be named, of which the fruit-buying public in this country know little or nothing, although many of them, if once introduced, would command a ready sale, if only as novelties. There are twenty or more kinds of the orange family, many of which are superior in flavour and appearance to those generally imported, some of which are remarkable for perfume; and others, as the rosy-flowered Persian citron, are invaluable for sherbet and other cooling drinks. The fruit trade, with all its vivacity and enterprise, is wonderfully conservative, and shippers rarely think of buying fruit that has not already become known in the markets. Beyond an experiment now and then with pomegranates, bananas, and some of the coarser kinds of dry fruits or nuts, Covent Garden strikes out no new line; yet comparatively close at hand are the West

Indian islands, naturally calculated to be the richest fruit orchards in the world, under good culture, and already overflowing with delicious and little-known fruits, of which the mango, anona, loquat, papaw, and guava are examples, and which, if once introduced in even moderately perfect condition, would take the taste of the fruit-eating portion of the public by storm. There is, above all, the mangosteen, a fruit which unites into one perfect combination the juiciness of the mango, the perfume of the bergamot pear, the luscious flavour of the nectarine, and the subtle essence of the pine-apple. To bring this and other delicious fruits from Malacca and the West Indian islands, is one way of accumulating wealth beyond the "dream of avarice," or Ruskin's "goddess of getting on."

We shall be told of course that the thing cannot be done; but exactly the same story—the "lion in the way whom Hercules slew," and the one we all have to either slay for ourselves or be devoured by—used to be said respecting the introduction of beef and mutton from the Pampas of South America and Australian farms. It used to be thought impossible to bring fresh oranges from the Azores, until somebody hit on the plan of gathering the fruit just before it attained its full ripeness, and packing it in very dry material. Apples are carried in large cargoes along with ice from American ports to Bombay and Calcutta, and no doubt some method is devisable, by which the fruit products of tropical gardens may be added to our home-grown desserts.

FRUIT AND VEGETABLE PRESERVING.

SOME idea of the immense amount of labour and capital employed in the fruit and vegetable preserving industry in this country may be gathered from the following condensed account of the Soho Square Works (which appeared a year ago in the 'Leisure Hour') and for which, together with other valuable statistical information given elsewhere, I am indebted to the proprietors, Messrs. Crosse and Blackwell.

Of vegetables for pickling, the most popular are onions, gherkins, walnuts, French beans, mushrooms, cauliflower, alone or mixed, under various titles; besides East and West India importations. In this department, the great rule of the house is not to employ any colouring matter. If purchasers want slightly green goods, they need not trouble Soho Square, for every pickle retains its natural hue, with the exception of such alteration as the acid of the vinegar produces; and thus the gherkins, cucumbers, and French beans are rendered a trifle yellowish. The process of pickling is simple.

The vegetables are first steeped in salt and water, then scalded with vinegar, and boiled in casks by a platinum steam coil, not in copper. Where requisite, imperfections or decays are first excised by female labour; and the perfect article is washed in vinegar,

bottled, corked, and capsuled. Of the quantity thus prepared, some idea may be formed, when I state that the onions are chiefly grown by Mr. Circuit, at East Ham, Essex, and that 13,000 bushels are grown to produce the quantity required during a single year. The grower employs five hundred and fifty women for several weeks to pull and peel them. From the same farm are derived the produce of several acres of cucumbers, besides what are obtained from other quarters. England does not furnish a sufficient quantity of gherkins, cucumbers, and cauliflowers for the demand, and therefore much of that kind of produce has to be imported from Holland. French beans are collected throughout the country. Walnuts are treated differently from other pickles, for after the salt and water bath, they are spread out on racks for a fortnight to dry and get black, and are then pickled like the rest. I took the liberty to ask about "how many bottles of these things were yearly made," and the books of the firm just named showed the return to be more than 2,500,000 bottles.

Sauces are numerous, but one of the most generally approved is pure mushroom catsup. For some years the mushrooms were gathered from the Sussex Downs, all around Lewes and along the coast. But it was discovered that the liquor was deficient in richness and flavour, and the supply is now obtained from the luxuriant pastures of Leicestershire. Of this condiment alone 30,000 gallons were made in 1874 by this one firm.

For various preserves more than 1000 tons of fruit

are used yearly. July is the height of the season for the softer descriptions, such as strawberries, raspberries, currants, and cherries; while damsons, plums, apricots, apples, oranges, and lemons follow later in the year. In a large building, occupied by Crosse and Blackwell in Denmark Street, what are called soft fruits are received fresh and cool as early as two o'clock in the morning; and during their preparation in July, the firm hire supernumerary labourers, the average required being from four hundred to five hundred females daily. At the gate (eleven o'clock A.M., July 14th) I observed thirty or forty women applying for admittance, but on entering I found the yard so full from the earliest hours that there seemed no room for more. Here were seated, with market baskets beside them, some four hundred and fifty women, busily engaged in stripping black currants from their stalks and depositing them in the wide-mouthed bottles familiar to the housewife. At a third warehouse I saw a hundred more, wiring bottles, which is done by each person at the rate of five gross or sixty dozen a day. The average wages are 2s. per day, and a clever picker may earn half-a-crown or more. The bottles are removed, filled with spring water, corked by a screw-press, submitted to the hot bath, cooled, and next day cellared in thousands, ready for demand at home or for exportation. White currants do not seem to attract attention, and pears maintain no proportion to their apple compeers, of which an immense quantity is used. The strawberries are chiefly brought from Kent and Middlesex in tubs for

jam, and raspberries from these as well as from other counties. Pine-apples come from the West Indies. Suppose these fruits to be housed and disposed of, more are prepared in another form, for immediate consumption and for storing; they are boiled by steam at a pressure of 40° to the inch, for jams and jellies. By this process all the watery portion of the fruit is evaporated in ten minutes. In order to get rid of the copper, Messrs. Crosse and Blackwell have tried many experiments with pans of different materials. Tin, enamel, and even silver have been tried, but in certain cases nothing would do but copper pans, and if the fruit be removed in a boiling state—not left to cool—no ill effects are produced. Some jams are put into earthenware and glass jars, and of these several were opened after a lapse of three or four years, and were found to be as good as when first bottled.

It is probable that we shall never do much in the way of preserving fruits and vegetables in this country, because our population is so far in excess of our cultivated land, that we seldom have either fruits or vegetables to spare for that purpose; our supplies of both must therefore be derived from the Continent and the United States. Either fruit or vegetables can be raised far cheaper in America than here at home, because land there is cheaper, and a far greater extent is cultivated; the produce thus raised, although perhaps inferior in point of flavour to that grown here, is, when preserved, quite as nutritious as that of home growth, while the price is within the means

of all. The prejudice existing against preserved food of various kinds is rapidly wearing out, and I see no reason why the choice fruits of tropical climates, such as bananas, lichees, mangoes, guavas, kumquats, and many others, should not find their way to our tables in a well-preserved state. We have only to look in the windows of our principal Italian warehouses to see the rapid increase that has of late years taken place in the number of preserved fruits and vegetables; and yet it is curious to note how fastidious many are with regard to some kinds of preserved fruits. A good housewife once gave me a look of withering scorn when I mentioned canned tomatoes; yet all her life, in common with thousands more, she had used dried grapes (raisins), orange-peel, figs, prunes, and yearly was one of the most careful of all preservers of home-grown fruit; indeed, in her house were made orange marmalade, strawberry jam, and red currant jelly, all excellent in their way, and yet a strong prejudice against "new-fangled notions" was entertained.

In preserving fruits, cans or tins should never be used if glass or earthenware can be obtained, as the acids decompose the soldering material employed, and the result is the production of highly injurious, if not actually poisonous, salts. Wide-mouthed glass bottles or jars are largely employed in nearly every American household, and are furnished with metallic lids, which screw down perfectly air-tight over an indiarubber washer or ring. Even for the ordinary purposes of jam making, these ought to find a large sale in this

country, as they obviate the trouble of using oiled paper or bladder, and by means of them the bottles can be opened at any time and their contents examined.

The beautiful crystallized or candied fruits now so common in our shop windows, are for the most part of continental origin. These consist of plums, especially prunes and greengages, figs, pears, apricots, slices of pine-apple, melons, and a few currants. The majority of these are crystallized whole, and are then packed tastefully in ornamental boxes of various sizes, suitable for Christmas and other presents; in this form they sell readily and fetch good prices.

It has often appeared to me singular that, while during two or three months of the year we have plums, cherries, and choice pears in abundance, and cheap, we never adopt any means to preserve them in a form fit for the winter's dessert. Tons of cheap, and I might add, in many cases, worthless fruit, are certainly sent off yearly from Covent Garden and other metropolitan markets, for jam making, but so far as the art of fruit preserving, in its best forms, is concerned, we may be said to know but little, and to practise it still less. The Chinese preserve many of their finest fruits, including the apricot and different forms of the common orange, all of which form agreeable conserves. The kumquat or "coumquat" is now largely imported, and a jar of this preserved fruit may now be obtained for a few shillings. A large trade is also done by the Chinese in preserved or candied ginger, which is, however, not a fruit, but the

fleshy rhizome of *Zinziber officinale*, a plant commonly grown in most tropical countries. Apart, however, from the supply sent over from China and the West Indian islands, in a candied state, large consignments of the fresh roots now arrive annually in this country, and these are sold at prices varying from 1s. to 1s. 6d. per pound.

Apart from home-grown produce and the continental and Chinese productions, however, a very extensive trade has quite recently sprung up in canned goods from the American States. Of the fruits and vegetables sent over in cans, the most important are tomatoes, cranberries, peaches, pears, pine-apples, asparagus, and fresh Indian corn, and in nearly every case these are of good quality, and as nutritious as the newly-gathered productions themselves. The canned tomatoes I have repeatedly used, and few fruits are more palatable, especially during hot summer weather; of course, such fruit is not expected to supersede that which is freshly gathered, but merely to form a good substitute for it at a time when tomatoes would otherwise be unattainable.

Among the newer methods of preserving fruits and vegetables, we must not forget the drying or desiccating process, now largely employed in America and elsewhere. The principle in this system consists in evaporating the water from the tissues, leaving the sugar, starch, and other nutritious portions of the fruit in a dry and more portable form, and better adapted for use during the winter months or in unproductive seasons. In New York and New Jersey States, different

modifications of the drying process are being extensively worked, and we have already samples of dried apples, pears, and mixed vegetables and herbs for soups, in the market. In some of our country districts mushrooms are dried for the last-mentioned purpose, and are found to retain their delicate flavour remarkably well; and, where pickled mushrooms or catsup is not obtainable, they form a good substitute. A new industry has also been opened up in the Western States and in California; there the grape-vine fruits well, and its produce is now made into raisins, some of which are sent annually to the English and continental markets.

PLANT PROPAGATION.

ALLUSION to the methods employed in increasing new or rare decorative exotics and fruit trees for trade purposes deserves a place here as one of the most interesting, and at the same time one of the most profitable branches of gardening industry. The best way of treating this part of our subject will be to describe the methods adopted in our large London nurseries, since such information will be of practical service to all who possess a garden.

The Romans were perhaps the first of original propagators and disseminators, and to them France, England, and other countries of northern Europe are indebted for the earliest introductions of choice fruits, vegetables, and flowers ; from the old abbey gardens in this country many choice fruits, seeds, and roots were widely distributed, and from such sources the earliest taste for gardening in this country must have emanated. Artificial means of propagation are now extensively resorted to by cultivators in order to reproduce and multiply existing cultivated forms of useful or ornamental vegetation in the shortest possible time ; while in the case of cross-breeding or hybridizing, provision is made for the possible origination of new forms or varieties, instead of merely reproducing the parent plants. There are many cases in which seed will not

exactly reproduce the parent plant, even when means are adopted to prevent cross-fertilization; and then recourse must be had either to cuttings, layers, or division, by which a portion of the required individual is secured, and means adopted to induce it to throw out roots and establish itself, as in the case of cuttings. Grafts are cuttings neatly joined to a suitable stock, by which they receive the benefit of roots already formed and in working order; but it is now known that grafts are frequently changed if worked on another variety as a stock, and therefore cannot be said to exactly reproduce the parent plant, as in the case when propagation is effected by cuttings, layers, or by dividing the original in any other way. We will, however, glance at the different artificial methods of plant propagation in their due order.

Division is the easiest and most generally adopted method by which low-growing or spreading Alpine and herbaceous plants are reproduced. Bulbs—as snow-drops, narcissus, and other gregarious kinds—are also multiplied in the same way, each separate bulb being a distinct individual plant. Although the word multiplied is used here, it is scarcely applicable, since no artificial multiplication of plants has really taken place. The same number of plants existed in the clump before they were divided, only by so dividing them, they afterwards, when planted in fresh soil, develop themselves much more rapidly than if left in one dense cluster. Nearly all plants which form low-spreading clumps, or masses of root-stocks, may be divided either by digging up the plants and pulling

them into rooted pieces, or by cutting off rooted portions around the sides of the clumps. The scaly bulbs of many lilies may be pulled to pieces and planted separately, and most of them when so treated will grow and form plants; but the bulbs of lilies are in reality only underground stems, so that the lily scales are really leaf slips or cuttings—just as potato “sets” are stem-cuttings—although at first sight one would imagine that they came under the head of division, using that term in its popular and technical sense. Division, then, may be defined as the removal of any naturally rooted portion from any kind of plant, and is especially practicable in the case of low-growing and spreading kinds. Layering is principally adopted in the case of low-growing or slender plants, which cannot readily or conveniently be multiplied either by



PLANT PROPAGATION BY LAYERING.

division, cuttings, or seed. *Lapageria rosea*, *L. alba*, *Chimonanthus fragrans*, *Aristolochia Siphon*, and *Magnolia grandiflora* are a few among many instances, in which layering is adopted as the best or readiest method of artificial reproduction. The operation is one of the simplest. A branch or stem of the plant or tree is

bent down, and pegged or otherwise fastened or held below the soil, with its growing extremity above the ground. In some cases, as in the carnation, the stem is nicked or slit at a joint with a sharp knife, which causes the juices of the plant to exude and form a spongy mass of cellular matter ("callus"), as is the case in cuttings. This callus is a sure sign of the appearance of roots.

This is the common and most simple plan of layering, but not always practicable. This is so in the case of erect-growing or tall-growing plants, and then a modification of layering is resorted to, exactly the same in its effects, but a little different in practice. In the case of *dracænas*, which frequently become what is technically termed "leggy," that is, devoid of foliage below, it is advisable to lower them, and a pot, or the two halves of a pot, with the drainage hole enlarged, is placed around the stem just below the leaves, and the bark is slit with a knife so as to cause a "callus" to form. The pot is then filled up with soil, and is kept continually moist. Sometimes this method is slightly modified, a bunch of wet moss being substituted for the pot of earth, or the system may be employed in a hundred different ways by the intelligent cultivator, and is especially applicable in the case of indoor or tropical plants and vines, where the part required to root ("strike") is too large or otherwise inconvenient as a cutting.

There is a common mode of propagating adopted in nurseries, technically termed "hillock layering," a plan as successful as it is simple. This is used in propa-

gating the quince, plum, and apple, (more especially Paradise, Doucin, and Nonsuch for stocks); fig, hazel, magnolias, and many other hardy trees and shrubs. In this case, it is necessary that the plant operated on be on its own roots. The tree or shrub is cut down nearly level with the ground during the winter. This causes a cluster of latent buds near the surface of the ground to develop themselves and form young shoots; and when this happens, a hillock of soil is raised so as to cover the base of each shoot, and the tops are pinched off, so as to induce them to throw out rootlets at the base. This they generally do during the summer; and in the autumn the soil is cleared away and the young rooted growths removed, and either potted or transplanted, as may be convenient. Such of the shoots as have not formed roots are left until the following spring or autumn; and these old stocks or stumps thus go on producing young plants for several years in succession.

Some climbing or trailing plants, as double-flowered rubus, wistaria, aristolochia, lapageria, vine, fig, and others, are propagated by "multiple layering," one or more of the last year's young shoots being laid in a trench and covered with soil, except at the growing end, which is left outside to grow and keep the branch so buried in an active state. Sometimes the branches so treated are bent, or partly fractured at intervals between the joints, or cross incisions or slits are made under the eyes with a sharp knife, so as to induce the "callussing" process and the development of its attendant rootlets. Long shoots or branches so treated

produce several individuals, according to the number of nodes or joints, and when rooted are separated and treated as separate plants, or for stocks if requisite.

Propagation by cuttings is a very common and, in general, expeditious mode of propagation, and, like division and layering, exactly reproduces the parent plant from which the cuttings are taken ; hence these modes of propagation are often preferable to either grafting or seed, especially soft-wooded cuttings, as they develop themselves much quicker as a rule than either grafted or seedling plants. Nearly all "soft-wooded" plants, of which fuchsias, lobelias, and pelargoniums are examples, are best propagated from cuttings of the stem. Many thick-leaved begonias, gloxinias, and melastomaceous plants are readily multiplied by leaf-cuttings, the fully developed leaf being inserted in a cutting pot as a cutting. Some begonias and strong-growing malastomads are readily propagated in this manner, if the leaves are divided into pieces an inch or so square. Hoyas, fuchsias, gesneras, and even bulbous plants, as amaryllis, may be reproduced in this way. In cases where cuttings cannot be obtained from the leafy portions of the plant—as in *Drosera (binata)* *dichotoma*, *Dioncæ musicipula*, Sarracénias, and Darlingtonia—cuttings may be made by dividing the underground stems, or rhizomes, and planting the cuttings so obtained in pans placed close under the glass of the propagating house. Cuttings of the rest succeed in a vast number of plants ; and it is often necessary that the cultivator should avail himself of every portion of the plant, at a time when speed in reproduction is

synonymous with commercial success. It is only in few instances that new or choice plants can be kept for years in the propagating house, since time is money; for, if one firm does not supply a new plant quickly, the chances are that another will, so keen is modern competition in trade.

Cuttings of the bulb are often resorted to, especially in the case of new hyacinths and other bulbous flowers, the cut portions of which emit little bulbils, which are afterwards grown on up to the flowering stage. Nearly the whole of the bulb trade, however, is carried on by the Dutch florists, if we except our Lincolnshire snowdrop growers. Many succulent plants—as *kleinias*, *pachyphytons*, *bryophyllums*, *rocheas*, and *echeverias*—may be readily propagated from the leaves inserted in pots of sandy compost. Cuttings may be formed of roots, underground stems, above-ground stems, bulbs, tubers, corms, leaves, or even portions of leaves, according to the plant operated upon. Some plants, however, are very difficult to propagate from cuttings, one of these being the fragrant *chimonanthus*; indeed, the late Dr. Lindley once offered a guinea for every plant of this well-known shrub raised from cuttings. *Lapagerias*, *aralias*, *ipomæa*, *horsfalliæ*, are other examples.

A cutting may be defined as any portion of a plant, root, stem, or leaf which is separated from the parent and induced to form roots of its own. Some plants are best and most quickly propagated by stem-cuttings; others, as *begonias*, *melastomada*, &c., by leaf-cuttings; and others again, as *drosera*, *dionæa*, *cephalotus*, *Sarracenia*, &c., by root-cuttings. There

are but few plants which may not be propagated from cuttings in one or more of the ways enumerated below.

"Eyes" are cuttings consisting of one bud only, just as "buds" are in reality single-budded scions or grafts. These single-budded cuttings, or "eyes," are generally employed in propagating the grape-vine, and more rarely in the case of roses and poinsettias. Both physiology and practice have decided that dormant eye or bud cuttings of the thoroughly ripened wood, as in the grape-vine or poinsettia, and cuttings of the root, as in caphaëlis, bouvardia, aralia, solanum, drosera, &c., are best treated precisely like seeds, so far as covering with soil, heat, partial darkness, and moisture are concerned; indeed, theoretically speaking, seeds are marginal leaf buds.

A cutting may vary in size, but it is in general from one inch to four inches in length, and consists of a young shoot taken off the plant with a sharp knife, after which it is cut off horizontally below a joint, and inserted in the earth if hardy, or in a pot of sandy soil if tender. Sometimes the lower leaves require cutting away to enable the cutting to be inserted in the soil. Soft-wooded plants, such as lobelias, fuchsias, and many others, will strike root freely if severed between the joints—anywhere, in fact; while geraniums will frequently rot off unless trimmed below a joint; and this is the case with many other plants, especially if their growth be succulent; hence, as a rule, it is always best to cut or trim cuttings below a joint.

Some plants propagate better from "slips" than

cuttings, "slips" being short side-shoots, or lateral branches, slipped or pulled off so as to bring with them a heel of the old wood. As a rule, cuttings "strike" better in the spring and early summer than in the autumn and winter, the plants being then more vigorous than is the case later in the season. This is an important fact for amateurs, but practical propagators, with every appliance in the way of heat and moisture, can afford to ignore Nature's way of working in this matter. Many soft-wooded plants, or those of succulent habit, as pelargoniums, helichrysums of the *H. bracteatum* type, and others of similar character, are rather difficult to propagate from cuttings late in the autumn, especially in wet seasons, and in such cases cuttings taken from pot plants which have suffered from want of water during the hot weather, will be found not only to strike root more easily, but they will not damp off so readily during the winter, owing to their tissues being firmer in texture.

The great secret in propagating nearly all plants from cuttings is, to prevent them "flagging," or drooping, from evaporation or loss of moisture after they are separated from the parent plant. It is to prevent this happening, that propagators invariably use close cases in the propagation of all the more tender stove and greenhouse plants. In the case of a single pot or two of cuttings, they are simply covered with a bell-glass, which serves exactly the same purpose in checking evaporation. All the dew-like moisture we see on the lights or glass coverings of the case, or trickling down the sides of the bell-glass, would have

passed off into the drier atmosphere, had the cuttings been uncovered; and this drying influence is prejudicial to the welfare of the cutting until it has formed roots, which, by drawing or pumping up moisture into the leaves, replace the loss occasioned by transpiration. Succulent plants, such as echeverias, pachyphytons, phyllocactus, sempervivum, gasterias, and many others, however, do not require covering, as Nature herself has formed them for living in a dry atmosphere, and has given them a thick-celled skin through which the water in their leaves can pass but very slowly; and to cover these up in the manner above described, as fitted to the generality of tender ornamental plants, would induce nine-tenths of them to rot, or "damp off," instead of forming roots. The same remark applies to plants with soft velvety or woolly leaves, as gnaphaliums, centaureas, of the *C. candidissima* (*C. ragusina*) type, and other plants with similar foliage which refuse to root unless fully exposed to the sun and air, either in a sunny frame, or on a shelf in the greenhouse near the glass.

Cuttings or slips of many hardy Alpine and herbaceous plants, or florists' flowers, as chrysanthemums, pansies, phloxes, and others of a similar character, may be inserted in pans of moist sandy soil and set in a cold pit, or in an ordinary garden frame placed under a north wall, such positions being well suited for this class of subjects. Many hardy shrubs and bush fruit trees, as laurels, currants, gooseberries, &c., root freely, if taken off in the autumn and inserted in rows in any cool sheltered border having a northern

aspect. Tamarisk, willows, and large branches 3 feet or 4 feet in length of some sorts of apples of the Bur-knot type, strike readily in this manner. Any light, sandy, moist soil may be used in which to insert soft-wooded cuttings. If, however, they are tender, or there is any danger of their damping off, as is the case with ericas, epacrises, azaleas, and many succulent plants, a thin layer of clean white sand should be spread over the surface of the compost in the cutting pots or pans; and the pots may in such cases be three-parts filled with crocks, so as to ensure perfect drainage.

Cuttings of many plants strike or root freely in any other moist substance, and soft-wooded plants of free growth, such as fuchsias, verbenas, and lobelias, root quickly and freely in sawdust, wet sand, or sand and water, if placed in a brisk temperature. Rose-cuttings, as well as those of the oleander and many other plants, root freely in bottles of soft or rain water; and cuttings of nepenthes, or pitcher plants, root well in living sphagnum moss in a close heated frame.

Grafting, which is an ancient art, consists in removing a portion of one plant—the part so removed being technically called the graft or scion—and applying it to another rooted plant called the stock, in such a manner, that they become united, and fulfil their allotted functions, the scion producing fruit or flowers, while the business of the stock is to supply the requisite quantity of root nutriment from the earth. In point of fact, the graft is a cutting which is induced

TABULAR VIEW OF THE PARTS OF PLANTS FROM WHICH CUTTINGS MAY BE TAKEN, AND OF THE SOILS, OR OTHER ROOTING MEDIA, IN WHICH CUTTINGS MAY BE ROOTED OR SEEDS SOWN.

LEAF.	STEM.	ROOT.
Whole leaves fully developed, as in Gesnera, Gloxinia, Hoya, Bryophyllum, &c.	Old or ripened wood.	Woody roots cut into pieces, as Manetti Roses, Common Roses, or Wild Briar for stocks.
Old leaves pegged down on a pan of soil, their ribs beneath having been previously slit across, as in Begonias and Melastomads.	Partly hardened wood of current year's growth, with a heel of old wood at the base.	Fleshy or partly hardened roots cut into lengths, as in Sea-kale, Iris, Horse-radish, Drosera, Sarracenia, Dionaea, &c.
Old leaves cut into pieces, with a portion of a thick rib or vein to each.	Young growth or current years wood in Autumn, when thoroughly ripened, as in Currants, Gooseberries, &c.	Annulated roots or jointed rhizomes, as in Ipecacuanha, &c. (It should always be borne in mind that rhizomes are true stems, although often underground; and, like the pseudo-bulbs of orchidaceous plants, they are always furnished with true latent buds, which start into growth under favourable conditions.
Basal or lower half of leaf and leaf stalk.	Young growth partly hardened at the base, but not thoroughly ripened.	
Whole leaf or basal half of leaf, with portion of the stem or bark and an auxiliary bud or eye, as in Rose, Pelargonium, &c.	Herbaceous cuttings made in heat, as in Erica, Epacris, and rare hardy trees and shrubs.	

TABULAR VIEW OF THE PARTS OF PLANTS—continued.

LEAF.	STEM.	ROOT.
(Leaves fully developed, and even the fleshy buds of many succulent plants, strike root readily. This is especially the case with Pachyphrons, Echeverias, Sem-pervivums, Gasterias, many Haworthias, and other plants of similar nature).	<p>Tubers cut to eyes, as in Dahlia, Potato, or Hollyhock, Marvel of Peru, &c.</p> <p>Eyes off ripened wood, as in the case of the Grape-Vine, and Poinsettia, Dracaena, &c.</p> <p>Eyes taken off young shoots, as in New Zonal Pelargoniums, Roses, &c.</p> <p>Knurs, or irregular masses of buds and cellular growth on stems, may often be used for purposes of propagation with advantage.</p>	<p>True roots, on the other hand, are not furnished with buds, as a rule, in any regular manner, although the roots of many plants have the power of forming irregular or adventitious buds, when severed from the parent plant and subjected to genial conditions of heat and moisture. I allude to rhizomes under this head, because they are popularly regarded as roots).</p> <p>Knurs on roots often form buds adventitiously much quicker than the ordinary roots, as in Yucca.</p>

TABULAR VIEW OF SOILS FOR CUTTINGS.

SOILS OR OTHER ROOT MEDIUMS.			PLANTS.
Heavy .. ..	.. ..	Loam, or loam and sand	Hardy trees and shrubs.
Moderately heavy	.. ..	Loam, peat and sand	Greenhouse plants.
Dry and light ..	.. ..	Peat and sand	Ericas, Epacris, &c.
Light and rich ..	.. ..	Leaf-mould and sand	Stove foliage plants, &c.
Dry .. ..	.. ..	Sand or sandstone grit, brick-dust, burnt clay, or gravel	Succulent and woolly composites.
Light and moist	.. ..	Sawdust, or sawdust and sand	Soft-wooded plants, as Cucumbers, Melons, Tomatoes, &c.
Moist .. ..	.. ..	Sand and water	Lobelias, Begonias, &c.
Moist and airy ..	.. ..	Living Sphagnum moss	Cuttings of Nepenthes, Gardenias, Dracenas, Orchids, &c.; Orchid and Nepenthes seeds, &c.
Moist air .. ..	.. ..		Nepenthes, Gardenias, Tree Peonies, and cuttings of Gesneriaceous plants.
Wet .. ..	.. ..	This medium is easily obtained by inverting the thumb pots on a bed of moist moss or sawdust, after which insert the cuttings through the drainage hole, but not so far as to touch the bed below. Soft water in tubes, bottles, or phials, with a little charcoal added to preserve it clean and sweet.	Nerium, Roses, Begonias, Fuchsias, and many stove plants.

to unite some of its tissues with those of the stock, instead of forming a "callus" and emitting rootlets,



CURIOUS EXAMPLE OF GOURD GRAFTING.

as happens when the cutting is inserted in the earth. Grafting is rendered practicable by reason of the

readiness with which the layer of soft granular tissue (Cambium) between the wood and the bark unites when brought into contact, and no matter what kind of grafting or budding is selected as most convenient, this main principle must not be lost sight of, or failure will be the result.

Cellular or soft granular growing tissues unite most readily when spliced together, as shown in the engraving (see page 183), where the stalk of a green gourd has been united to a yellow egg-shaped variety, after which the end of the green kind was cut away, and its place supplied by the end of a large white variety.

Nearly all herbaceous or cellular vegetable tissues unite readily when the plants are in full growth.

One of the most convenient and useful of all the modes of grafting is "root grafting," which, as shown in the illustration, consists in fitting the scions or grafts just as in ordinary cleft-grafting, only that thick pieces of roots, having a few fibres at their lower ends, are substituted for the ordinary kind of stock.

PLANT PROPAGATION BY ROOT-GRAFTING.



Among all the authors who have written on grafting, from Parkinson downwards, I find none more explicit than Austen, who, in his 'Treatise on Fruit Trees' (1755), p. 48, writes as follows:

"And in setting the grafts into the cleft, observe this for a most speciall rule, to joyne the inner side of the barke of the stocke, that the sap may more easily come out of the stocke into the graft to feed it, for the main current of the sap is betweene the bark and the wood. And regard not the custom of many grafters in setting the outsides even and smooth, not considering the insides, their success is according to their skill for the most part. We know the bark of a big stock is much thicker than the bark of a slender graft, and if the outsides be smooth and even, the insides must needs be uneven."

Double grafting was, I believe, first secretly practised by the old German gardeners about three centuries ago. Parkinson (1629) recommends that the Red Roman nectarine should be budded on an apricot shoot that has previously been worked on a plum stock, and Austen, in the above cited work (p. 57), says, "But I hold it best to inoculate the Red Roman nectarine upon the branch of an apreece, which before hath been inoculated upon a good plum stock, that it may give not only a larger, but a finer nourishment than ordinary plum stocks can doe." It is interesting to note, that while most exogenous plants may be reproduced from grafts, it is nearly impossible to graft a single species of endogenous plant, if we exempt some Aroids. Success in grafting demands not only considerable dexterity on the part of the operator, but it is highly essential that there should be an affinity between the stock and the graft. Of the nature of this affinity, or consanguinity, we as yet

know but little; and botanists give us very little aid in determining what the cause and nature of this affinity may be.

In M. Baltet's 'Art of Grafting' (a first-rate and very exhaustive work, by the way, which every cultivator should possess), the following remarks on this subject may be found:

"The laws of the affinity of species are almost unknown. The observations hitherto made have been undertaken in a practical rather than in a purely scientific spirit, as in the fertilizing of plants. The results obtained up to the present can only be regarded as a matter of fact. No theory has as yet been deduced from them, except that kinds to be united must be of the same botanic family. For instance, the peach and the apricot are grafted on each other with difficulty, while both do well on the almond tree and the plum tree. All the cherries unite with the Mahaleb, but it will not succeed as a graft on any of the cherries. The sweet chestnut prospers on the oak, but will not do so if grafted on the horse chestnut, which belongs to another family. The medlar and the quince, which have solitary flowers, flourish on the hawthorn, whose flowers are in corymbs. The chionanthus, so nearly allied to the lilac by its panicked flowers and ample leaves, only succeeds well on the common ash and on the flowering ash, which have compound leaves. On the other hand, the sorbus, with pinnate leaves, is more vigorous when grafted on the thorn (whose leaves are more entire), than it is when grown on its own roots.

"The grafting of evergreen trees on deciduous kinds presents more than one singularity. The photinia, allied to the beam tree, and the eriobotrya (loquat), allied to the medlar, are grafted on the medlar and not on the hawthorn. On the last, as a stock, the cotoneaster and the pyracantha do well. The mahonia flourishes on the berberis, and the common laurel succeeds on the bird cherry, and even on the wild cherry, from which it differs so much in appearance." But while some evergreens succeed well on a deciduous stock, "the grafting of deciduous plants on those that are evergreen, has in almost every case been attempted in vain. Those who are fond of oddities can, with the assistance of grafting, have on the same thorn stock at the same time, fruiting-branches of the pear, the medlar, the beam tree, the service tree, the mountain ash, the European and Japanese quince, and also see there the flowers of the double and red thorns, the cotoneaster, and the pyracantha. They may gather from the same plum stock, plums, apricots, peaches, nectarines, almonds, corymbs of the Canadian cherry, and flower garlands of the Chinese and Japanese plum; but these whimsicalities are unworthy the attention of cultivators."

A correspondent of the 'Cultivator' remarks: "We can graft the apricot on the plum, and the peach on the apricot, and the almond on the peach, thus producing a tree with plum roots and almond leaves. The wood of the stem will consist of four distinct varieties, though formed from one continuous layer. Below the almond wood and bark we shall have perfect peach

wood and bark, then perfect apricot wood and bark, and at the bottom, perfect plum wood and bark. In this curious instance, we see the 'intimate correspondence between the bark and the leaf, for, if we should remove the almond branches, we might cause the several sorts of wood to develop buds and leafy twigs each of its own kind. Each section of the compound stem has its seat of life in the cambium layer, and the cambium of each reproduces cells of its own species out of a common nutrient fluid." It is curious to note that the gooseberry will not grow on any of the edible currants, but flourishes on *Ribes aureum*; and it is singular to observe that, while the pear is short-lived on the apple as a stock, and but little better on the seedling hawthorn, it lasts well on the quince. *Bignonia radicans* will grow and bloom on the catalpa as a stock. The mysterious and unknown causes which govern the affinity of plants must be studied and solved in the garden, and in this direction there is a wide field of useful labour and research open to the cultivator; for theories deduced from dried specimens, however plausible, will never teach us how plants live, although we may derive useful knowledge of structure and geographical distribution from study in the herbarium.

Hybridizing, or grafting, or both combined, will yet do much to settle the uncertainty which exists with regard to genera, species, and other groups into which plants are at present divided artificially; and here is a sphere of noble labour of which none need feel ashamed to bear a part. "And why graft at all?" some may ask; "is not each plant best on its own roots?" to

which I reply, Undoubtedly, when in a state of nature; but when we improve plants by cultivation, selection, or hybridizing, in giving them qualities which we desire they should have, we often weaken their natural constitutions; for plants, like animals, have to bear the ills as well as the advantages resulting from civilization, so that what in their natural state would be superfluous, in the garden becomes desirable, if not absolutely essential.

According to M. Baltet's work above cited, the objects of grafting are: 1. To change the character of a plant by modifying the wood, the foliage, or the fruit which it is required to produce. 2. To excite the development of branches, flowers, or fruit on the parts of a tree where they are deficient. 3. To restore a defective or exhausted tree by the transfusion of the fresh sap of a vigorous kind. 4. To bring together on the same stem the two sexes of monœcious (or diœcious) plants, in order to facilitate their reproduction. 5. To preserve and propagate a great number of woody or herbaceous plants, for use or ornament, which could not well be reproduced by other means of multiplication. One of the most curious instances of the beneficial effects of grafting is that of the Chinese Kumquat Orange (*Citrus japonica*), which absolutely refuses to bear well on its own roots, even on its native hills, but which produces heavy crops of its delicious egg-shaped fruits when worked on the hardy *Limonia trifoliata*; and Mr. Robert Fortune, the eminent Chinese traveller, informs me that this stock is universally adopted for this fruit by the native gardeners in China and Japan.

TABULAR VIEW OF THE PARTS OF PLANTS THAT MAY BE USED EITHER AS CUTTINGS, SCIONS,
OR STOCKS.

As considerable difficulty is often experienced in rooting cuttings of many exogenous plants, cultivators overcome the matter by grafting cuttings made of the young growth, on bits of root well furnished with fibres. In the case of cultivated varieties, roots of the typical species may be used for this purpose, and also roots of nearly allied but less valuable species where procurable. Cleft or splice grafting in a close heated case is rarely unsuccessful.

STEMS.	TUBERS.	ROOTS.
<p>Fully ripened shoots of current or preceding year's growth, as Apples, Pears, Currants, Gooseberries, &c.</p> <p>Young growth of Conifers and evergreen shrubs, &c., by splice, terminal cleft, side or whip grafting in open air or in heat.</p>	<p>Potato by splice or wedge grafting.</p> <p>New or rare varieties of Holly-hock on the crowns of common or single kinds by splice or cleft grafting, or in-laying.</p>	<p>New or rare Roses by splice or cleft grafting on Manetti, common Rose, or Wild Briar roots.</p> <p>Apple, Pear, &c., on own roots, or on roots of Crab, Doucin, wild Pear, or Quince. Root cuttings of Apples, Pears, and Quinces will grow, but not so surely as layered branches.</p>

TABULAR VIEW OF THE PARTS OF PLANTS—continued.

STEMS.	TUBERS.	ROOTS.
<p>Herbaceous or very young stems before the cellular tissues begin to harden, as in the case of the young laterals or footstalks of the Grape-vine. Peaches, by inarching to fill gaps, &c. Many plants of herbaceous growth, as Potatoes, Cucumber, Melon, or Tomatoes, are easily rooted from cuttings in heat.</p> <p>Succulent stem or fruits, as in the case of Epiphyllums, Euphorbias, Mamillarias, Echinocactus, &c., on Cereus stocks, grafted, gourds, or other fruits.</p> <p>Eyes from young growth on young shoots, as in the case of budding Pears, Hollies, stone fruits, and rare deciduous or evergreen shrubs.</p>	<p>Dahlia, shoots from large growing kinds, as <i>D. imperialis</i>, or from new varieties inserted on tubers of common kinds by cleft or wedge grafting; or as cuttings, in the usual way.</p> <p><i>Ipomoea Horsfallia</i> on tubers of <i>I. (Batatas) paniculata</i>, or other tuberous species; ornamental foliaged <i>Dioscoreas</i> on tubers of common Yams.</p>	<p><i>Eriobotrya japonica</i> on collar or root of Medlar or Quince: Dammar on own roots.</p> <p>Clematis, new or rare kinds, on roots of common sorts: <i>Ficus elastica</i>, <i>F. Chautieri</i>, &c., on roots of common Fig (<i>F. carica</i>). Root cuttings of Clematis grow freely.</p> <p>Vine by splice or cleft grafting on roots of common sorts.</p>

TABULAR VIEW OF THE PARTS OF PLANTS—continued.

STEMS.	TUBERS.	ROOTS.
<p>Eyes from fully ripened wood when dormant, as in the Grape-vine, &c. These eyes also grow freely when inserted in moist warm earth as cuttings.</p> <p>(Grafting is mostly performed with wood buds, but it has long been proved by T. A. Knight, Esq., and other scientific horticulturists, that bloom or flower buds may be removed from fruitful branches and inserted in barren ones in the autumn with every success, and a crop of fruit thus insured, where otherwise even flowers would not have been produced.)</p>	<p>Gloxinias, new and rare kinds, may be worked on the tubers of common seedling sorts, as in Dahlia: this is, however, but rarely resorted to, as these plants are more easily propagated from leaf cuttings, or by cutting up the old tubers, retaining an eye or bud to each section, this being inserted in moist warm earth, and induced to root like an ordinary stem cutting.</p>	<p>(Even leaves may be grafted where they are of a permanent and succulent or cellular character. In the Jardin Muetie at Paris, I saw a plant of Pachyphyton which had a young scandent Cras-sula depending from the point of each leaf, this having been the feat of a clever propagator, who wished to amuse his non-horticultural visitors with something wonderful. This might be done as a curiosity in many other cases, especially amongst succulent plants).</p>

HYBRIDIZING AND CROSS-BREEDING.

KOELREUTER was probably the first amongst us to raise hybrid plants, his experiments in that direction having taken place early in the eighteenth century, and Linnæus gave an impetus to the study of vegetable sexuality by the publication of his views on the subject in his 'Fundamenta Botanica.' Gaertner and Wichura also threw much light on the question of hybridity by their experiments made on the Continent, and in this country the late Dean Herbert stimulated horticulturists by the production of numerous beautiful hybrids, and also by the publication of his celebrated paper on 'Hybridization among Vegetables' in the 'Journal of the Royal Horticultural Society,' vol. ii. (1847), p. 1-81. Artificial hybridization and cross-breeding had now, in fact, become general. About this time fuchsias and calceolarias became greatly improved, as were also gladioli, rhododendrons, and camellias; nor were ornamental plants alone the subjects of ennoblement, inasmuch as Knight had previously paid attention to the amelioration of apples, pears, plums, peaches, cherries and peas, and with great success, some of his seedlings being still popular in our gardens, notably Knight's monarch pear, and his marrow peas.

Among the earlier and most successful hybridizers

in this country after Dean Herbert, may be named Mr. James Cunningham, Messrs. Colville, Mr. Anderson-Henry, Mr. Gowen, Mr. J. Standish, and Messrs. Rollison, to the last of whom we are indebted for forty or fifty varieties of beautiful seedling, or rather hybrid heaths. About 1854 Mr. J. Dominy raised the first hybrid orchid (*Calanthe Dominiana*). This has been succeeded by about fifty hybrids belonging to other genera, and it is not too much to say that the production of these hybrids has completely revolutionized the somewhat restricted views formerly held by botanists, as to the generic and specific distinctions of orchidaceous plants.

At the present date hybridization and cross-breeding are everywhere largely practised, not only in European gardens, but also in those of Japan and China, where, indeed, the arts of culture and plant improvement by selection and grafting have been carried on from time immemorial. Their improved races of primulas, azaleas, lilies, diospyros, pinks, irids, chrysanthemums, and Moutan peonies, are indeed as wonderful in their way as anything produced by hybridizers in this country. New forms among plants, the result of hybridization, may be said to constitute one of the most remunerative branches of the nurseryman's business. The actual process of fecundation is carried on by the plant itself, all the operator can do being to bring the pollen in contact with the stigma when the latter is fully developed or receptive. By hybridism we are enabled to blend the characteristics or qualities of two nearly related species or individuals, and the

facts recently observed in the grafting of potatoes and cytusus seem to indicate that the same general law governs the union of gemmules, whether the union be sexual, as in the case of hybridism and cross-breeding, or vegetative, as in the case of grafting and budding.

Since writing the above, Mr. Darwin's new work * on 'Cross Fertilization' has come to hand, its object being to show that cross-fertilization is beneficial to cultivated plants, and especially is this shown to be the case, when either the pollen or the seed-bearing parent is brought from a distance or from a fresh stock, since, as the author himself puts it, "the advantages of cross-fertilization do not follow from some mysterious virtue in the mere union of two distinct individuals, but from such individuals having been subjected during previous generations to different conditions, or to their having varied in a manner commonly called spontaneous (sports), so that in either case their sexual elements have been in some degree differentiated, and secondly, that the injury from self-fertilization follows from the want of such differentiation in the sexual elements." In the work itself numerous experiments are described, and the results tabulated, proving that in a state of cultivation, cross-fertilized plants are superior in height, weight and fertility, to the self-fertilized plants. "Therefore," says Mr. Darwin, "the difference between the self-fertilized and crossed plants raised by me cannot be attributed to the superiority of the crossed, but to the inferiority of the self-fertilized seedlings, due to the injurious effects of self-fertiliza-

* London: John Murray, 1876.

tion." Self-fertilization is, however, shown to have an important advantage of which cultivators will not be slow to avail themselves, namely, that by carefully self-fertilizing and cultivating a variety under similar conditions for five or six generations, a marked degree of fixity or permanence is implanted in it, so much so, that a variety so treated may be relied on to "come true" from seed.

Variation can in many cases be communicated to a green-leaved plant by budding or grafting it with variegated scions from the same or allied species. In the case of abutilons this is a well-known fact, and soon after Messrs. Veitch introduced the vermilion-flowered, green-leaved *A. Darwini*, it was succeeded by a variegated form that was artificially produced on the Continent by budding it with scions from the golden-blotched *A. Thompsoni*. This practice has also succeeded with the ash, sweet chestnut, laburnum, pelargonium, common chestnut, maple, jasmine, oleander, and passion flower. Black, white, and red, or striped grapes have been produced on the same bunch by splicing the branches of a black-berried and a white-berried vine together, and analogous effects have been produced by grafting the tubers of red and white potatoes. The oft-quoted *Cytisus Adami* was produced by inserting a shield bud of *C. purpureus* beneath the bark of *C. laburnum*, and we have many records of pears being altered in size, colour, flavour, and time of ripening, owing to their having been grafted on the quince stock. Mr. Meehan has obtained cross-bred plants by uniting the split buds of a red Astrachan

and Rhode Island greening apple together. The grafts with a single bud were split as near through the centre as possible, and a piece of each kind fitted accurately together, so as to appear as one scion. Twelve scions were so grafted, and three grew. Two of them have fruited, and both are different from each other, and also from their parents.* Hence it will be seen that grafting is not to be relied on as a certain means of reproducing either varieties or species in a pure state, but, on the contrary, may in some cases be employed to change the colour or other attributes of a species or variety in a manner closely analogous to, if not identical with, hybridism and cross-fertilization.

* 'Gard. Monthly,' Oct. 1876, p. 306.

PUBLIC GARDENS.

THE importance of well-managed public gardens in the vicinity of large towns can scarcely be overrated, and that the value of such institutions is now more fully appreciated than formerly, is one of the most healthful signs of modern progress. Beautiful and varied gardens near large towns do more towards developing a taste for plants and flowers than anything else with which I am acquainted, and if their influence is to be exercised to advantage, they must be the best of their kind. Our London parks possess permanent features in the shape of well-diversified lawns, water surfaces, shelter, and variety of tree-growth, all of which will bear comparison with similar features in public gardens of any other northern country; but the chief interest belonging to our parks in summer is the display of fine-foliaged plants, which, if they be on the whole scarcely so luxuriant as those in French gardens, are nevertheless very effective as seen associated with fine undulating breadths of green turf sheltered by trees and shrubs of various kinds.

Among the changes which are especially noticeable in the flower-garden arrangements of recent years is the growing popularity of all kinds of sub-tropical and coloured-leaved carpet-bedding plants, these being used instead of flowers, and not without some good

reasons, for carpet-bedding and sub-tropical plants withstand the vicissitudes of our climate better than such fragile flowering subjects as pelargoniums, lobelias, and calceolarias; but to the formal manner in which the carpet plants are arranged, exception may be taken. Another advantage in leaf-gardening is, that colours obtainable in that way are richer and softer than those of flowering plants, while the more stately growing kinds enable us to secure a variety of plant form in our gardens, otherwise unobtainable. There is, however, great danger that we may be surfeited by this fashion, just as we have been with that of pelargoniums and calceolarias.

Battersea excels all other London parks in the number of well-grown specimens of hardy fine-foliaged plants which it contains, and among these may be especially noted *Gunnera scabra*, *Bambusa gracilis*, *Polygonum Sieboldi*, *Ailantus glandulosa*, *Catalpa syringæfolia aurea*, golden elder, tamarisk, pampas grass, and some of the more stately, hardy, herbaceous perennials. Nevertheless, there is yet much to be done in introducing the best of the hardy herbaceous plants into our flower-garden arrangements; nothing, indeed, could well be more effective in sheltered shrubbery borders than *Yucca fragilis*, with its spires of silvery bells; foxgloves, too, which have been used in Victoria Park, and also in Kensington Gardens with such good results, might likewise find a place elsewhere. What grand effects might also be produced by grouping large masses of *Tritoma uvaria*, pampas grass, *Helianthus orgyalis*, *H. multiflorus*, and scarlet

gladioli! while even the orange and golden-rayed lilies might be planted here and there in deep, rich, shrubby borders with advantage, and, thus situated, their flowers would remain in beauty much longer than in exposed positions.

If a small portion of the care and expense now devoted to the culture of pelargoniums and lobelias were laid out in an intelligent use of hardy herbaceous plants and fine-foliaged trees and shrubs, our public gardens would be far more permanently beautiful and interesting than they are at present, when the display is limited to a few weeks' duration in summer, and when we get alternantheras, echeverias, and pelargoniums by the hundred thousand, all arranged in formal patterns. We fail, however, to see why these designs should invariably be formal ones, and not half so beautiful in their relative proportions as the parti-coloured pattern of an old Gothic cathedral window. Bright-leaved dwarf growing plants, now popular in our gardens, are decidedly useful for affording soft and rich masses of colour, but there is not the slightest reason why these colours should invariably be made to resemble gaily coloured hearthrugs, or gaudy patchwork. Bright colours on well-kept green lawns are desirable, but it surely must be bad taste to introduce groups of plants into our home landscapes—our living pictures—which a painter of but moderate ability would hesitate to introduce into any of his transcripts of modern garden scenery. In the Royal Academy exhibitions of past years, we have had charming pictures of tall evening primroses in old-fashioned parterres,

and roses, clematises, and scrambling vines, but no one was sufficiently bold or inartistic enough to introduce even a distant glimpse of the now fashionable and aptly-called "carpet" bedding into a single picture.

It is to our great public gardens that we must look for improved examples of garden decoration, and if their contents consisted chiefly of plants well arranged that would withstand our climate, that would be all the more desirable, inasmuch as these public examples are seen by thousands annually, and are copied as closely as possible in many private gardens throughout the country. Our London parks may indeed be said to be great schools of gardening, and as such their arrangements and contents should be the best and most varied of their kind. Instead of this, in nearly all our London parks the extent of the beds and borders which have annually to be filled with temporary summer flowering or fine-foliaged plants is so great, that much of even this fugacious style of gardening is badly executed—so badly indeed, that in nearly all our parks I could point out particular beds and borders every season which are so far below mediocrity, that they would not be tolerated at all in good private establishments. To remedy this evil, therefore, it is desirable that such badly planted space should be devoted to hardy fine-foliaged shrubs, or to the more stately hardy flowering plants of temperate climes.

Our public gardens, however, possess one grand advantage, and that is, all their tree-growth is natural and not clipped into flat-topped or formal shapes, as at

Fontainebleau or Versailles; indeed the beauty of all our suburban public gardens is dependent on this luxuriant and unrestrained variety of tree-growth, and nowhere can this be seen to better advantage than at Kew, Richmond Park, and in the grand old park around Hampton Court. As to the question, Can satisfactory tree-growth be secured in the midst of London smoke and fogs? no better answer could be given than that supplied by specimens of *Ptelea trifoliata* in Printing House Square, or the fruitful old mulberries and verdant poplars, which, until lately, graced the city garden of the Drapers' Company, within a stone's throw of the Bank of England. The luxuriant plane trees in nearly all the West End squares, not forgetting the perfect specimen at the entrance to the South Kensington Museum, or the celebrated one in Cheapside, are living witnesses as to tree-growth in towns being a possibility, leaving out of the question the satisfying variety of trees and shrubs in Kensington Gardens, or those in the private grounds of Buckingham Palace, or in the Temple Gardens, and on the Thames Embankment.

The following list comprises the principal public parks and gardens within the metropolitan district, in all of which gardening may be studied in some of its numerous phases with advantage.

EXTENT OF THE LONDON PARKS.—The acreage of our metropolitan parks, promenades, and open spaces is given here in list form, as being more convenient for purposes of reference and comparison.

PUBLIC GARDENS.

203

	Acres.		Acres.
Hyde Park	380	Kensington Gardens ..	290
St. James's Park	154	Regent's Park	403
Green Park		Battersea Park	230
Victoria Park	280	Crystal Palace	168
Greenwich Park	174	Clapham Common	190
Alexandra Park	192	Wimbledon Common ..	628
Wandsworth Common ..	302	Epping Forest	510
Barnes Common	120	Kennington Park	19

Total, 4040 acres.

In addition to the greater parks of London, vested in the Crown, but open to the public, the Metropolitan Board of Works have the following open spaces under their management in various parts of the metropolis and its suburbs:

	Acres.		Acres.
Blackheath	267	Hampstead Heath ..	240
Finsbury Park	115	Southwark Park	63
Hackney Downs	50	Hackney Common	30
North and South Mill		London Fields	27
Fields	57	Tooting Graveney	
Tooting Bec Common ..	144	Common	63
Thames Embankment	14		
Leicester Square			

Total, 1070 acres.

From official sources we learn that the total estimate of the amounts required in the year ending March 31st, 1878, to defray the expenses of the royal parks and pleasure grounds is 117,645*l.*, as against 115,912*l.* for the year previous. The estimated cost of the principal

London and other parks and gardens for the year 1877-8 is as follows :

	£
Battersea Park	7,824
Edinburgh Botanic Garden	1,763
Bushy Park	2,230
Hampton Court Park	877
Hampton Court Gardens	1,953
Kensington Gardens	7,314
Kew Botanical Gardens	20,967
Regent's Park and Primrose Hill	9,930
Richmond Park	3,030
„ Ranger's Department	2,842
St. James's, Green, and Hyde Parks	36,534
„ Ranger's Department	1,806
Victoria Park	8,613
Bailiff of Royal Parks' Salary	355

It has been long recognized that London owes a great deal of its admitted healthiness to its parks and open spaces. All the year round they act as great lungs to the mighty city, while in summer, and even to a considerable extent in winter, they are the Sunday resort of its weary workers.

The open spaces of London are not confined to any one particular quarter. The East End has Victoria Park ; and during the spring and summer months this garden is a most enjoyable one, plenty of bright colours being afforded by the parterre plants ; and the herbaceous perennials, which are grouped very tastefully along the margins of the shrubbery borders, are also highly effective. The lake here is likewise well designed, and some pretty glimpses of willow and alder fringed water margins are obtainable.

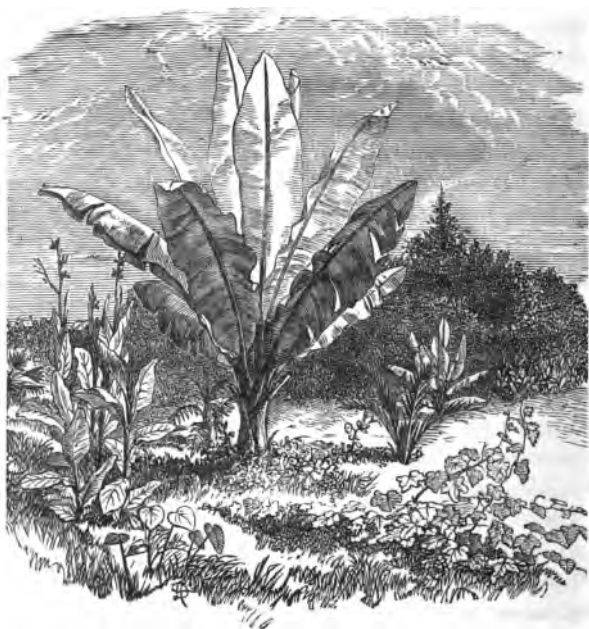
FINSBURY PARK is new and as yet somewhat bare,

but still it is rapidly becoming what it is intended to be; and the half-dozen "downs," "fields," and "commons" that go under the general name of Hackney Downs (50 acres) are all valuable open spaces. They have also lying just outside their boundaries, the two forests of Epping and Hainault, and several green breadths that may be called everybody's and yet no man's land. South London has also some fine parks and open spaces.

To the south-east lie Woolwich Common, Greenwich Park (174 acres), and Greenwich Common, and nearer at hand Lewisham Common, Peckham Rye, and Southwark Park. Directly south lie Camberwell Park and various little remnants of ancient greens and commons, while the grounds of the Crystal Palace may almost be said to answer as a park for the wide districts of Sydenham, Norwood, and Penge. Here also flower gardening forms a prominent feature during the summer months, and the dahlia beds in autumn are likewise very attractive. This is one of the very few public gardens near London in which roses luxuriate. The views obtainable from the terrace are most extensive and beautiful, and in the palace itself the most notable vegetation consists of feathery tree ferns and palms, as well as some noble examples of the climbing butcher's broom (*Ruscus androgynus*).

BATTERSEA PARK is one of the most modern and at the same time most varied and beautiful of all our metropolitan parks, and especially is this so during the summer months, when, apart from other attractions, we have the best flower gardening near London, the

bright colours of the flowering plants being softened and augmented in beauty by contrast with fine-foliaged plants of various kinds. Flower gardening, according to the style that happens at the present time to be



SUB-TROPICAL GARDENING IN BATTERSEA PARK.

fashionable, is remarkably well carried out here, flowering plants, carpet bedding, and sub-tropical gardening being alike the best of their kind, and in some of the beds we have the three systems combined,

with very good results. No one of our other public gardens will ever be able to compete with Battersea in sub-tropical gardening for some time to come, since they all lack, more or less, that one great essential wherever tall, large-leaved, or tender tropical plants are plunged outside, viz. shelter from high winds, without which success is impossible. Again, there is such a preponderance of evergreen and deciduous trees and shrubs here, and such deliciously cool green turf and charming peeps across the ornamental water, that a much larger proportion of bright and glowing colour can be used, than in cases where the beds are arranged in large designs on the more exposed lawn. The wealth of stately sub-tropical plants also relieves the eye very much, and an additional advantage is obtained by placing the masses of decided colour or carpet beds on strips of turf backed by dense green trees and shrubs, and at considerable distances apart. Added to all this, there is a much larger variety of tree beauty, a larger and better water garden, and a more diversified surface than is to be found in any other of our public gardens in the same space. At Battersea, thanks to those who planned and laid out the place, we get a great variety of garden beauty collected together in a comparatively small space, and are consequently much better able to admire it here than elsewhere; and this, as we take it, is the reason why Battersea pleases us better in its floral display than the other London parks, altogether apart from any question of management.

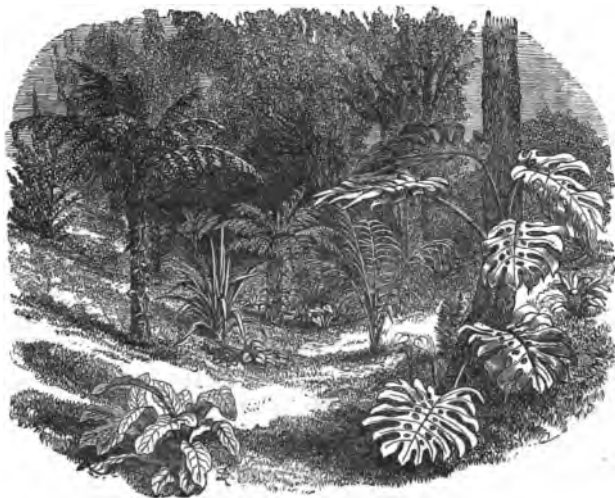
Crossing the river, we next come upon Ealing and

Acton greens (leaving Hounslow Heath on the left, as out of our radius), Wormwood Scrubs, and numerous little greens and commons. North of Hampstead and Alexandra Park, the open spaces are fewer and smaller, and owing to a more scattered population, less required. North-east lie Epping and Hainault forests, mentioned before, each of them large and full of natural beauty.

HYDE PARK, the most noted of the public grounds of London, takes its name from the ancient manor of Hyde, which at one time belonged to the abbey of Westminster; it became public property in 1535, was sold by order of Parliament in 1652, and again recovered to the Crown on the Restoration, in 1660. It was originally of the usual character of English private parks, a broad piece of quiet pasture ground, with numerous great trees scattered over it singly and in groups. In 1730-33 a body of water was introduced (the Serpentine), but with no care to give it a natural or even a graceful outline. Roads have also been formed in the park from time to time, less with a view to public pleasure-driving than for convenient passages. What is called Rotten Row (a corruption of the French route du roi) was originally the roadway for the king and his cavalcade between Westminster and his palace of Kensington; it is a mile long, and 90 feet wide, has a surface of loose fine gravel, and is now used by the public only on horseback; it is separated from the Serpentine and "ladies' mile" (the fashionable drive of London) by a walk and strip of turf of variable width. It divides and overpowers what might otherwise be a

pleasing landscape expanse, and no attempt has been made to mitigate the harshness of the invasion.

South-west lie Clapham Common (190 acres), Wandsworth Common (302), and Wimbledon Common (628). Tooting Bec and Tooting Graveney Commons and Battersea Park also belong to this district. To the



A FERN GLADE IN A LONDON PARK DURING SUMMER.

north lie Hampstead Heath (240 acres), the Green Lanes, the grounds of Alexandra Park (192 acres), and Primrose Hill.

KENSINGTON GARDENS, in the western suburbs, are especially remarkable for the charming variety of trees and shrubs which they contain, and few spots within an hour's walk of St. Paul's Cathedral are more

attractive than these gardens during the spring and summer months. In Hyde Park, too, flower gardening is well carried out during the summer months. The sheltered glade at the head of the Serpentine is generally planted with tall dracaenas, tree-ferns, musas, aralias, and fan-leaved palms, the stems of the large poplar trees near the margin of the water being draped with tropical climbers, such as *Monstera deliciosa* and robust species of anthurium. The margin of the stream itself is fringed with the royal fern (*Osmunda regalis*), large growing glaucous-leaved grasses, the buttress-like clumps of ivy, and other evergreens, being employed as a background for the silvery-variegated *Arundo donax* and variegated nergundo, while the sloping strip of turf in the foreground is brightened by a few oblong and heart-shaped beds of verbenas and flowering and fine-foliaged pelargoniums. Some clumps of osmunda are sprinkled along the margin of the moat or stream, but scarcely so effectively as one would like to see them, since the main object in planting them seems to have been to block up the spaces between the clumps of ivy—to form a fence of osmunda, in fact, instead of natural and beautiful masses of one of our noblest ferns. This osmunda, *Arundo donax*, and the silvery thalia should be naturalized beside the water margins of all our parks if possible; and surely it is possible, for in a garden at Fulham they grow in noble masses eight or ten feet high every year. The light feathery-like tamarisk might also bear them company; it thrives best in moist turf, and is one of the most distinct of

all hardy trees or shrubs, its slender branches moving in a pleasing and graceful manner in the softest breeze. Carpet bedding has received much attention here, and as our climate in autumn is so wet, its adoption is a step in the right direction, the good points belonging to this system are, that we can make sure of a display of bright colour in any pattern or design that an artist can draw, independent of the weather, the beds in which it occurs being in fact effective from the first day on which it is planted, while a drenching shower or two will not wash out its colours, as is the case with flowering plants such as pelargoniums.

ST. JAMES'S PARK, which was formed and walled in by Henry VIII., was much improved under Charles II., and was arranged as it now appears chiefly in the reign of George IV. Its principal attractions are its collection of trees and shrubs and willow-fringed water margins, through which some good views are obtainable of Westminster Abbey and the Houses of Parliament.

REGENT'S PARK, formerly part of old Marylebone Park, was laid out in 1812. There is a drive of nearly two miles around it, and within its boundary are the Botanic and Zoological Gardens and a lake. Here also is a small collection of hardy and tender exotics, and the garden of the Botanic Society, so far as its green lawns, tree-growth, and other permanent features are concerned, is considered one of the most pleasing in arrangement of any garden of similar extent near London.

All these parks, commons, and open spaces are within the actual metropolitan district. Taking in a little wider radius, the heaths, downs, parks, and greens within easy reach of our great metropolis become almost innumerable.

Beginning at the south-east and sweeping round by the south, west, north, and east, we find Chislehurst Common; a little south-west of this, Hayes Common, a great resort of cockneys in summer, where any day a score of pleasure-vans may be seen; a little farther to the west, Addington Common, also much frequented; still farther west, Mitcham Common and Banstead Downs, not to speak of those of Epsom, or of the score of small spaces kept "open" by the strong hand of the law and the general consent of the people.

Approaching the Thames by a north-west course, we meet with Richmond Park (2253 acres), the largest near London except that at Windsor (3800 acres). The views obtained from the castle and terraces at Windsor are amongst the most beautiful in England, and the Home Park and "slopes" are remarkably well wooded, noble avenues of mistletoe-laden limes and giant elms intersecting the park in various directions. Beautiful, however, as are the gardenesque surroundings of this royal residence, there is one little sequestered corner on this estate which especially deserves notice, being the resting place of two of our sovereign's nearest relatives. This is the garden attached to Frogmore House, which is certainly one of the most enjoyable I have ever seen—a truly peaceful retreat. In spring it is a perfect paradise of lilac,

hawthorn, and laburnum, and the tree-growth here is the most varied and perfect of its kind, the most notable examples being deciduous cypresses, one of which measures 80 feet in height, and a Chinese maiden-hair tree nearly as luxuriant. There are, too, splendid specimens of larch, spruce, thuja, beech, lime, chestnut, and other noble habited shade trees, associated with the broad and peaceful sweeps of mossy turf and elegantly fringed water margins; here our wild birds enjoy a regal welcome, which they repay with grateful song.

HAMPTON COURT AND BUSHY PARK are also well worth notice. It has often struck me that these fine old gardens are underrated, an opinion which will be shared by all garden lovers who may care to visit them at nearly any time of the year and note their many varied attractions. Admirers of fine trees will find here much that will interest them. The chestnut avenue in Bushy Park is unique in its way, and this as well as some fine limes and other trees afford abundant shade during the hot summer months. On entering the Court gardens by the Bushy Park entrance, and turning to the right, past the maze, a tree-shaded gravel path leads straight towards the old kitchen gardens; and midway is a small circular green, in the centre of which a thick-boled, spreading yew throws its sombre branches out over the fresh green turf. From this centre (which reminds one of the celebrated "table ronde" and the radiating woodland avenues in the old forest at Chantilly), eight shady walks radiate, forming cool and retired promenades. The principal trees here are elm, beech, and

limes, with a dense undergrowth of laurels, aucuba, privet, and smaller yews and other conifers, the margins of the walks being fringed with well-kept turf, across which the subdued light flickers here and there with pleasing effect. A few larch, spruce, and tall Scotch pines diffuse delicious odour; and this fact reminds us that it is possible to bring some of the health-giving pine and fir forest fragrance into our gardens, for whoever has sniffed the odour of a grove of spruce firs like those magnificent specimens which fringe the upland lakes at Chatsworth, will admit that this is a desirable and easily attained addition to our woodland walks and drives. A few firs and pines, judiciously arranged in clumps among lighter-foliaged and deciduous trees, will also increase their pictorial effect. In the gardens proper, the view up the Thames from the river-wall terrace is a very pretty one, the river itself being fringed with graceful vegetation, consisting partly of willows. The mixed borders are well filled with roses, stocks, cloves, pinks, scented oak-leaved and stag's-horn pelargoniums, mignonette, sweet peas, and other fragrant flowers, all of which should be found in greater abundance than they are in our London public gardens and parks, where every bare inch of soil should be covered with wall-flowers in spring, and mignonette and stocks, and other fragrant annuals during the summer and autumn months.

The public property in many of the larger commons of London is so complicated by ancient manorial and local rights, that its extent cannot be accurately stated.

The aggregate area, however, of the several public and Crown parks that have been named, together with so much of the commons lying within the metropolitan district, as is under the Board of Works, is about 13,000 acres. There are also, of the squares and gardens, most of which have been established by landlords, and are private property, but of great public advantage, about 1200 acres.

Liverpool and its suburb, Birkenhead, have six parks, five of which are recent acquisitions, and as yet incompletely prepared for public use. The largest, Sefton Park, contains 387 acres, and Birkenhead Park 120 acres, besides the leased villa grounds (60 acres) by which it is surrounded. It was undertaken as a land speculation, and, though too small in scale and too garden-like for the general popular use of a large community, it nevertheless forms a pleasing recreation ground, and is one of the most instructive, having been laid out and the trees planted under the direction of the late Sir Joseph Paxton.

The corporation of Leeds has lately purchased a noble park of 800 acres, containing a fine stream of water, and a lake of 33 acres, formed by the previous owner. Its scenery is diversified, and it commands fine distant rural views. These advantages and its exemption from injury by factory smoke compensate for the necessity which the citizens will be under of reaching it by rail, its distance from the town being four miles.

Birmingham, Manchester, Bradford, and other manufacturing towns have also all acquired parks, either

through subscriptions by citizens or joint-stock companies. At Halifax a park was formed and given to the town by the late Mr. Frank Crossley. Derby is likewise provided in the same way with an arboretum, and the city of Lincoln is forming an arboretum on land purchased for that purpose. Most of the small towns of England, indeed, have some place of recreation, as, for instance, the old city walls and the river banks above the town at Chester, the common and the old castle grounds at Hereford, and the cathedral greens at Salisbury and Winchester. These consist in each case either of a long, broad walk, pleasantly bordered and possessing fine views, or a few acres of smooth turf with shaded borders. Even our hamlets almost invariably have their bits of cricket ground or common, where, on benches under some patriarchal oak or elm, old people meet to gossip and watch the sports of youth. Phoenix Park, at Dublin (1752 acres), is a fine upland meadow, fringed and dotted with trees, but unskilfully laid out and not well kept.

GARDENING INDUSTRY ABROAD.

THE gardening industry of other countries deserves notice in connection with my present plan, more especially as their exported products influence the price of home-grown produce very considerably—indeed to a much larger extent than is generally thought to be the case, and this is particularly observable as regards fruits. French and Belgian gardens now supply our markets with enormous consignments of plums, cherries, figs, pears, and a few choice apples. During the winter months, salading material, especially lettuces, endive, chicory, and witloof are largely imported from the Paris market-gardens, as are also many tons of horse radish from Holland and Belgium.

Pear culture forms one of the staple industries in many parts of France and the Channel Islands, where the trees are mostly grafted on the quince stock and trained as pyramidal or bush trees, and from these, during the months of July, August, and September, several hundreds of pounds worth of pears are sold by auction every day in Covent Garden market alone. Eight or ten years ago the imports of pears assumed large proportions, and are thus alluded to in the 'Times' of May 14th, 1868. "The quantity of pears sent to our markets from France is surprising. Messrs.

Draper, the salesmen of Covent Garden, showed me by their books that from one importer alone they sell from 60*l.* to 100*l.* worth of French garden produce (chiefly pears) each market day; and a garden fruit merchant has told me of one dealer in pears alone who annually collects in France and sells in our markets 10,000*l.* worth of that fruit." Facts like these are most significant for the British fruit grower, and give us some idea of the immense commercial importance of our trade in hardy fruits. Even the railway embankments in many parts of France and Belgium are fringed with fruit trees, and many of the small fruit growers in Jersey and Guernsey have made money sufficient to enable them to purchase their own land.

Grape culture, which in Southern Europe is a main industry in connection with wine making, is, perhaps, as much connected with agriculture as with horticulture, but the fruit growers in the Channel Islands now send early forced grapes to our London markets, and large quantities of late grapes, principally of the Black Hamburg and Gros Colman variety, come from the same quarter in the autumn. These last are grown under glass in which no artificial heat is used, and the fruit so produced has greatly reduced the price of home-grown fruit during the last few years. Strawberry culture has also been taken up by the Channel Island growers, who can supply our markets with ripe fruit fully a month before our own crops are ripe.

The following is a tabular return of fruit and vege-

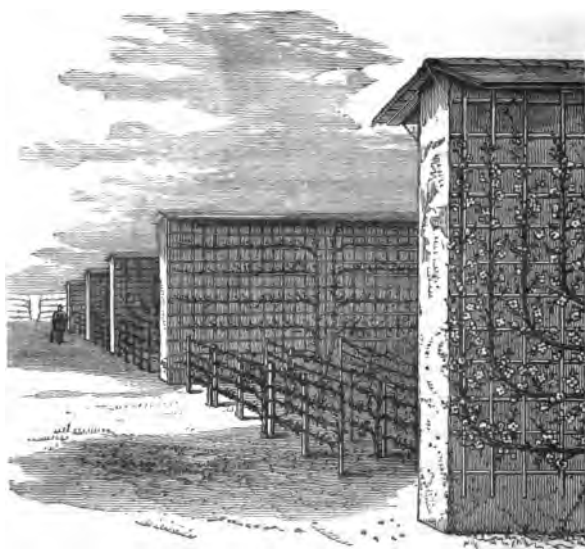
tables sent to our markets by the Channel Island growers during the last five years.

Description.	Value.				
	1871.	1872.	1873.	1874.	1875.
Raw fruits	£ 19,933	£ 47,867	£ 20,856	£ 20,031	£ 14,141
Vegetables	12,817	9,710	12,270	18,125	24,065

Large imports of plums, principally of the green-gage, Orleans, and blue prune varieties, arrive from Belgium during June and July, and these are sold by auction at from 10s. to 30s. per sieve, and selected samples, neatly packed in poplar wood boxes, holding from twenty to thirty fruits each, fetch much more, even as much as 2s. to 3s. per box being realized. An important industry in French and Belgian gardens consists in the extensive culture, preservation, and exportation of prunes or blue plums. From France alone we received in 1875 considerably more than eighteen thousand hundredweights of prunes, of the gross money value of about 24,000*l*.

Peach culture is another speciality in some gardens near Paris, notably in the vicinity of Montrieul; indeed, the last-named village is almost wholly devoted to this industry, just as the walls of Thoméry and Fontainebleau are devoted to the culture of the delicious amber-tinted Chasselas grapes. The value of the entire peach crop of Montrieul in a good season is 2,000,000 francs. There are 600 growers who altogether raise 60,000,000 fruit, and for more

than a month, 500,000 peaches arrive fresh every morning at the Halles Centrales and other fruit markets of Paris. I visited these gardens a year or two ago, and was struck with the healthy vigour and fruitfulness of the trees. The peach gardens are



A PEACH GARDEN NEAR PARIS.

rarely more than two or three acres in extent, and are surrounded and subdivided by whitewashed stone walls, on which the trees are carefully and symmetrically trained. Indeed it is no exaggeration to say that in many cases the peach trees here are as perfect

in health, symmetrical training, and productiveness, as human skill can make them. Among other curious facts observable in these peach gardens, I noticed that the trees grafted on the plum stock ripened their fruit at least a week or ten days earlier than the same variety grafted on a free peach stock, and this early development of the fruit was further enhanced by placing sheets of blackened paper on the whitewashed walls behind the fruit. Slitting the branch a little below the fruit, or tying a tight ligature of lead or copper wire, were other means adopted by M. Chevalier to enhance the size and earliness of the fruit. I found Mr. River's English seedling peaches the earliest in these continental gardens, and they are also valued for their precocity in America, where peach culture is carried on as simply as apple culture is in English orchards. Our French imports are as follows :

Description.	Value.				
	1871.	1872.	1873	1874.	1875.
Plums, Prunes, and Prunellos..	£ 75,391	£ 61,534	£ 16,425	£ 93,029	£ 76,928
Raw fruits	214,542	203,753	168,759	287,663	271,278
Nuts, unnamed ..	101,418	106,092	132,682	189,416	128,284
Vegetables	45,123	81,448	97,123	92,872	77,625

FRANCE has long supplied us with large quantities of fruit, as is proved by the following extract from the late Mr. W. Salisbury's 'Hints to Proprietors of Orchards,' published as long ago as 1815, a fact

sufficient to show that the trade in imported fruits is not of such a "mushroom" character as it is by some supposed to be. "I have this evening, 20th November, 1815, passed through Covent Garden, and seen upwards of one thousand casks of apples that have been imported from France; and not less than an equal quantity heaped together in warehouses near Fleet market, containing in the whole not less than 40,000 bushels. The fruit I have this evening seen is, at a moderate calculation, worth 20,000*l.* at the price it is selling for in the London markets."

The French and Belgian growers for profit, like those nearer home, adhere to a few well-known varieties of fruit. The nurseries of M. Leroy, of Angers, form perhaps the most extensive fruit-tree establishment in the world, and some index to the best sorts of pears may be gathered from the fact, that of seven of these varieties collectively, the average sale every year is about 140,000 trees, and as many as 20,000 each are sold of William's Bon Chrétien (the Bartlett of the Americans) and Duchess d'Angoulême. The remaining five sorts are Louis Bonne of Jersey, Beurré Diel, Beurré d'Aremberg, Beurré d'Amanlis, and White Doyenné. The highest number sold of any other variety does not exceed 1000 trees.

France probably has distributed from her commercial nurseries more trees than any other nation, and is supposed to have 200,000 acres in such nurseries.

The public gardens and parks of Paris are numerous and extensive, the State having long held large tracts of forest land, the remains of those which covered the

wild-boar haunted country in the time of Caesar. These parks vary in extent from 1000 acres, as at St. Cloud, to 40,000 acres, as at Fontainebleau. Perhaps the most popular of the Parisian and suburban parks are those of Boulogne, Vincennes, Marly, St. Cloud, Rambouillet, St. Germain, Chantilly, and Compeigne. The first five are within a ten miles radius of Notre Dame, and may be reached by rail in less than half an hour, and the whole eight contain more than 170,000 acres of diversified rock, water, woodland, and other scenery. The scientific garden of Paris is the Jardin des Plantes, which corresponds to our own botanical establishment at Kew, although far inferior in extent and general appearance to our Kew gardens. Another large establishment, Jardin de la Ville de Paris, or "La Muette," was employed mainly in the culture of decorative plants for the parks and squares during the summer months, and also for supplying the principal offices on public occasions. Another useful garden is that of the Acclimatisation Society, in which all kinds of plants and animals likely to be of service from an economic or other point of view are reared, and observations made and recorded with a view to their profitable introduction either into France or her colonies. We have no garden corresponding to this in this country, the labour of testing plants of supposed economic value being partially carried on at Kew, the introduction of useful animals being mainly left to private speculators.

The annual cost of securing shade trees, flowers, and decorative plants for the parks, promenades, and

gardens of Paris, is as follows: Bois de Boulogne, 387,000 francs; Bois de Vincennes, 270,340 francs; city squares and spaces, 545,220 francs; these sums being for labour power and materials, to which must be added cost of plants, &c., 40,000 francs; glass houses, &c., 11,000 francs; total 1,253,560 francs, or something like 50,140*l*.

Documents lately published by M. Joly, and based for the most part on M. Husson's work on the 'Food-Supply of Paris' and the Report of the Paris Chamber of Commerce on the 'State of Labour in France,' supply the following particulars:—In 1872, in the Department of the Seine alone, there were 24,803 cultivators of different kinds, who together produced nearly 1,100,000*l*. worth of fruit, vegetables, and flowers. There were in the department 427 gardens, covering an area of over 200 acres, of which 2,500,000 square feet were under glass. The number, in these gardens, of glazed frames is computed at 360,000, and in addition to these, 2,000,000 bell glasses (*cloches*) are used to forward lettuces, endive, radishes, and other early crops. The quarries used for mushroom growing had an area of nearly 20 acres, and consumed 2200*l*. worth of manure, the value of the year's crop being 72,000*l*. On the market of the Halles Centrales were sold whole during the same year:—Choice fruit, 790 tons, at an average of 60 cents per pound; ordinary fruit, 3186 tons, at 37 cents per pound; choice vegetables, 668 tons, at 43 cents per pound; ordinary vegetables, 11,600 tons, at 15 cents per pound. The gross amount realized by the sales was

over 430,000*l*. The total quantity of fruit brought into Paris during the year is estimated by M. Husson at nearly 62,000 tons. Fresh vegetables from the south of France amounted to 19,700 tons; those from the neighbourhood of Paris, to 343,620 tons; dried vegetables and herbs, to 16,735 tons.

The subjoined table, prepared from data collected by the Administration des Douanes, shows the quantities of garden produce exported from France during the year 1874:

	Tons.
Oranges and lemons	3,257
Fruit, fresh	42,700
Ditto, dried and flattened	14,000
Ditto, preserved, conserves, &c.	2,135
Almonds, filberts, and walnuts	15,000
Vegetables, dried	24,161
Chestnuts	6,300
Potatoes	173,144
Total	<u>280,698</u>

With such statistics one cannot be deceived as to the enormous productions of France in fruits and vegetables, and they lead us to hope that by continuing to advance in the refinement of our own system of culture, and by the introduction of new varieties, we may add much more to our own public wealth; at any rate, the example set us by our thrifty neighbours should not be lost on our own market gardeners and fruit growers.

One of the most singular and profitable of all the products of French horticulture is the common mush-

room, which is cultivated in caves and cellars in and around Paris, to an extent which can scarcely be realized in this country. At Montrouge, just outside the fortifications of Paris, mushroom culture is largely carried on in the mines or subterranean quarries whence stones for building purposes have been extracted, much in the same manner as we obtain coal here at home, except that these quarries are only 50 or 60 feet in depth. The entrance to these mushroom caves is effected by descending a well-like shaft by the aid of a rude ladder formed of a pole, with pegs fixed at regular intervals on which to rest the feet and hold on with one's hands at the same time. At the bottom of the shaft is an open space, whence passages radiate in all directions communicating with other spaces, which, together with the sides of the narrow corridors, are covered with long narrow beds of horse manure and soil in which the mushrooms are grown. Mr. Robinson describes one of these caves at Montrouge as containing six or seven miles of mushroom beds; but in 1867 M. Renaudot had a length of over 21 miles of mushroom beds in a large cave at Méry, and another at Frépillon had a length of 16 miles. In 1867, mushroom culture was a profitable industry at Méry, and frequently from two to three thousand pounds weight of mushrooms were sent from thence to the Paris markets; but it is singular to find that after a course of culture for a few years, these caves gradually become unproductive, and are then cleaned out and abandoned, for the same reason as that which induces farmers to leave their land

occasionally fallow. The mushroom caves (together with the beds in the market gardens) not only supply the Paris markets, but large quantities are exported to England and other parts of Europe; one house alone is mentioned by Mr. Robinson, in his book on mushrooms, as sending 14,000 boxes annually to our markets.



A MUSHROOM CAVE NEAR PARIS.

This industry is spreading in nearly all directions around the French capital, and even as far distant as Chantilly (the Epsom Downs of France); and on the roadside from thence to Mort Fontaine we find an "Hotel des Champignonnistes," just as we have our sign

of the "Jolly Gardeners" at Hammersmith, Fulham, and other places where market gardening is largely carried on. Among the minor gardening industries of France may be enumerated the growth of vegetable and flower seeds, and the bulbs of gladioli; but more especially have the French excelled in the production of new varieties of that most thoroughly English of all flowers, the rose, for which our amateurs and nurserymen paid some millions sterling, before it was demonstrated by Messrs. Paul and other English trade growers, that varieties equal in beauty and more vigorous in constitution could be produced from seed in our own gardens. Hence, of late years we find English names cropping up more freely every season in our rose catalogues; and although even now immense sums are spent by our nurserymen in importing new varieties of this popular flower, a reciprocal trade has been established, where formerly the French rose-growers had a monopoly analogous to that of the German seedsmen at Erfurt, and the Dutch bulb-growers at Haarlem and Bloemendaal.

In the warmer parts of southern France (as also in Italy), flowers of various kinds as well as fragrant herbs are largely grown for the manufacture of perfumes, and many hundreds of acres are devoted to the growth of odorous flowers.

If we consider that British India and Europe consume about 150,000 gallons of handkerchief perfume yearly, and that the English revenue for eau de Cologne alone is about 8000*l.* a year, and that the total revenue for imported perfumes is estimated at

about 40,000*l.*, and that one great perfume distillery at Cannes, in France, uses annually about 140,000 lb. of orange blossoms, 20,000 lb. of acacia flowers (*Acacia Farnesiana*), 140,000 lb. of rose flower-leaves, 32,000 lb. of jasmine blossoms, 20,000 lb. of tuberose, together with a great many other sweet herbs, we may judge of the immense quantity of material used for perfumes. To show the value of perfumes to the countries adapted for their production, the following table, compiled from the publications of Piesse and Brande, and the 'Cornhill Magazine,' October 1864, may show why it is so :

	£
One acre of jasmine plants, 80,000, will produce 5000 lb. of flowers, value 1 <i>s.</i>	250
One acre rose trees, 10,000, will produce 2000 lb. of flowers, value 9 <i>d.</i>	75
One acre of orange trees, 100, at ten years old, 2000 lb. of flowers, value 6 <i>d.</i>	50
One acre of violets, 1600 lb. of flowers, value 2 <i>s.</i>	160
One acre of acacia trees (<i>Acacia Farnesiana</i>), 302, at three years, 900 lb. of flowers, value 2 <i>s.</i>	90
One acre of geranium plants, 16,000, 40,000 lb. leaves, producing 2 oz. of distilled otto per cwt., at 5 <i>s.</i> per oz. ..	200
One acre of lavender, 3457, giving flowers for distillation, value	30

Then it must be also noted, that whatever the value which the plants yield in flower, fruit, leaves, and stems, it is increased threefold under manufacture, and this manufacture consumes other local produce called into existence by it, such as olive and other oils, fats, alkalies, wheaten flour, colouring matter, pottery, and glass ware, which combine to make the farmers and the

manufacturers contribute largely to the maintenance of population and the wealth of the perfume countries.

Throughout France, gardening is practically taught in the primary and elementary schools. There are at present 28,000 of these schools, each of which has a garden attached to it, and is under the care of a master capable of imparting a knowledge of the first principles of horticulture. Even in the schools to which no garden is attached, the theory of cultivation is taught; but it has recently been decided by the Minister of Public Instruction, that the number of school gardens shall be largely increased, and that no one shall be appointed master of an elementary school, unless he can prove himself to be capable of giving practical instruction in the culture of the soil.

The finest kitchen garden in France is that belonging to the State at Versailles, which produces an average yearly revenue of 20,000 francs for fruit and vegetables alone. It was laid out by De Quintinye, gardener to Louis XIV. In 1874, the Assembly decided to employ it as a model market garden and school of horticulture, and it is expected that it will now materially aid the full development of horticultural industry in France. For the following interesting account of Parisian market gardening, I am indebted to Mr. Robinson's work on French gardens.

The Paris market gardens in early spring are, for the most part, covered with glass, large clear bell-glasses, about 18 inches high, and small shallow frames. The gardens are very small, seldom more than an acre, often less, and usually an oblong piece

of ground enclosed by white walls, with a house, sheds, &c., in one corner. There is no space for walks; the ground is too precious and too dear. Small paths between the crops suffice; the place is rarely seen by anybody except those who cultivate it. The large bell glasses first strike the eye, from the healthy and beautifully green verdure with which each is filled. A huge cos lettuce rises to near the top of the glass, while at its feet, pigmies round a giant, there is a ring of these dwarf tender cabbage lettuces so often seen in Covent Garden in winter and early spring. The icy breath of March blows over the garden, but the plants are cut off from it, and sit in the sun within. We have all laughed at Swift's bottled sunbeams; but bottled sunbeams are, fortunately for lovers of tender green-meat, among the actualities. Sometimes these glasses are thickly placed on shallow hot-beds, when used for winter and early spring crops; sometimes on early and spring crops; sometimes on slightly sloping beds of rich light soil. In frosty weather they are covered with straw mats, which are taken off during the day-time. The bell-glasses are used, for the most part, for the production of cos lettuces; the shallow frames for the noire lettuce, so much in demand in winter. Among these lettuces are, in some cases, already planted and thriving, the cauliflowers that will replace them by and bye, and come in for use early in the season. Whole frames are occupied with seedling melons and with seedling tomatoes, with which the rich ground will be cropped before this day two months, and which will yield an abundant return.

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Radishes and many other saladings are gathered from these frames in like manner, and in this way the market is rendered almost independent of the season or the weather. The opinion prevails widely that, the smaller the holding, the worse the culture. It may be so in some cases; very small holdings and very high culture are the rule here. The owners are certainly as hard-working, and, apparently, as poor men as any independent workers can well be, but they appear to gain at least as good a livelihood as the farmers who try to cultivate a hundred or more acres in the best parts of Canada. This Paris market-gardening is, however, so essentially peculiar and special, that it would be unsafe to deduce any broad conclusions from it alone. The culture in the open fields round Paris is much inferior, and very scratchy and imperfect; hence, the parsnips and various other vegetables raised in that way seem very inferior to those seen in the London market.

In and near Paris one rarely sees much variety in one garden; the tendency is to special culture. Thus, one whole town and its environs is devoted to asparagus, another district to navet and turnip culture.

Mushrooms form a speciality, and even the forcing of asparagus is sometimes made the main effort of a life. One may look in vain in any of these gardens for either rhubarb or seakale. It is odd to reflect how slowly and curiously ideas sometimes travel. Go into the deserts of Utah, and enter the garden of a Mormon elder; or, farther still, six or seven thousand miles

away on the coast range of the Pacific, and visit a Californian fond of his garden, and you will find pie-plant (rhubarb) and seakale as well known as the potato. Cross the Channel, and in two hours we are in a land where they are seen no more, except perhaps in very rare cases as curiosities, or in a public garden in their places in the botanical arrangement.

French horticultural industry is on the increase; from fifteen to twenty years ago the exports of fruits and vegetables realized 8,000,000 to 10,000,000 francs; they now realize 35,000,000 to 40,000,000. Our fruit and vegetable growers for market are, on this account, every year experiencing decreased prices. The low cost of carriage for all kinds of goods, and the present improved and more speedy modes of shipment, have brought the produce of more favoured climates to our very doors. This, the result of free trade, however embarrassing to the home producer, is productive of much good to the labouring millions of our large towns.

To enable our home growers to compete with those of other countries, it seems desirable that the State should make the subject of earth culture a necessary part of the instruction given in all board schools; or, better still, by the institution of an extensive and well managed national garden, in which the best fruits and vegetables of all kinds might be grown experimentally, and instructions given, not only to cultivators, but to all others interested in the best methods of cultivating the soil. Gardening has been practised in some English schools in the north of England already, and

with good results from a profitable point of view. At Eyemouth school, near Berwick, the boys' garden produce realized in ratio a value of 51*l.* 8*s.* 6*d.* per acre, and at Paxton, in the same neighbourhood, a sum equal to 40*l.* 1*s.* 4*d.* We are not told under what conditions these results were gained, and it is unfair to calculate the rate per acre from very small plots; still we have here abundant evidence that school gardens can and have been made self-supporting. The gardens at Kew, and those of the Horticultural Society at Chiswick, have done good work in the education of gardeners; but what is now most required is a grand national garden, wherein lectures and demonstrations in horticulture might be given to all anxious for information on such subjects, and not merely to the dozen or two of young gardeners who happen to be therein employed for the time being.

BELGIUM has long been noted for its horticultural enterprise, many of our culinary vegetables having been introduced to this country from Holland and Flanders some three or four centuries ago. An additional stimulus is given to the progress of gardening industry in Belgium, owing to the interest taken in horticulture by his majesty, King Leopold, who encourages the holding of floral exhibitions at Brussels and elsewhere on a grand scale, and extends his hospitality to visitors who are attracted by them from other countries.

Ghent, or Gand, may be considered the head quarters of the gardening industry of Belgium, since here

nearly all the most important nurseries are situated. That founded by the late M. Louis Van Houtte is the most important, and, in its way, is unrivalled. The main productions of this establishment are camellias, of which 500,000 are sold annually; azaleas, gesneras, ericas, palms, orchids, and fine-foliaged plants, which are propagated and distributed by the thousand in all parts of Europe and America. Collectors from this establishment were sent to different parts of South America, Africa, and other tropical countries for new plants, and these were not merely increased and distributed in their natural state, but in many cases were improved by blending or hybridizing them with other kinds. Those lovely gesneras, the eucodonias, were originated here in this manner, as were also the Ghent azaleas, and many varieties of *A. indica* and gladioli, *ælstromerias*, and other plants. All lists, circulars, and catalogues are printed on the premises, as is also the letterpress and beautiful coloured plates of the well-known gardening periodical, 'Flore des Serres et les Jardins de l'Europe,' which the late proprietor conducted personally as the best means of bringing his beautiful productions into general notice. The German and Belgian gardeners are especially skilful in the rapid propagation of all kinds of ornate and useful plants, and this has enabled them to compete with our own nursery trade with much success. From Belgium we receive large imports of fruits and vegetables, as shown in the following extract from the trade returns for 1875.

Description.	Value.				
	1871.	1872.	1873.	1874.	1875.
Raw fruit	£ 95,822	£ 116,392	£ 53,046	£ 255,442	£ 160,548
Onions ..	43,760	25,950	14,264	22,674	41,605

HOLLAND has a special industry, and a most remunerative one in her trade in bulbs, which are chiefly cultivated near Haarlem and Lisse, and which owe their superiority as much to the suitable texture and position of the soil—a calcareous sand resting on peat—as to the lavish use of manure, and the most unremitting attention on the part of the cultivators; many of the latter are little proprietors, and they grow the bulbs or seeds on their own land for the larger houses, who carry on the export trade. An area of 125 acres devoted to hyacinth growing, near Haarlem, is estimated to bring in a revenue of nearly 30,000*l.* The plants and flower roots sent from Holland to this country in 1875 were valued at 59,289*l.*, and it is interesting to contrast the value of these ornamental plants with that of the 694,071 bushels of potatoes also sent to us from Holland in the same year, the value of which was estimated in the government reports at 172,829*l.* In those parts of Holland where bulb culture is practised, the routine is generally as follows: the first year, the soil is broken up and dug to a depth of from five to six inches, a heavy dressing of cow manure being applied, and a crop of

potatoes taken, after which the bulbs are planted in the autumn, and the beds remain covered with reeds until May. The second year's culture consists in collecting the bulbs about midsummer, and then grass seeds are sown to prevent the light soil from drifting, and in the autumn the bulbs of different kinds are sown on the greensward. Large quantities of vegetable and other garden seeds are grown in Holland and Belgium, and the subjoined table gives some idea of our imports of fruit and vegetables from these countries.

Description.	Value.				
	1871.	1872.	1873.	1874.	1875.
Raw fruit	£ 59,542	£ 186,859	£ 76,648	£ 159,476	£ 110,504
Onions ..	61,337	94,044	123,613	126,373	152,345

The gardening industries of Germany are of considerable importance, the principal products being seeds, ornamental plants or bulbs, and fruit. The head quarters of the German flower and garden seed trade are at Erfurt, but there are large establishments elsewhere, engaged in seed growing for our markets.

As a solitary example of the seed-growing industry of Germany, I may make some allusion to the German stock, inasmuch as the main supply of seeds of this popular flower is grown at or in the immediate vicinity of Erfurt, and no fewer than 600,000 flower-pots are

annually planted, with about 3,600,000 of these plants solely for seed production. Placed in a single row, these pots would extend nearly 50 miles. In 1863, 150,000 pots were planted with 1,550,000 gilliflowers for seed, and these produced their proprietors an income of 50,000 thalers. The pots are placed on elevated shelves or stages in dry airy greenhouses, and only just sufficient water is given to prevent the plants from drooping; the seed-pods are also thinned, and the result of this treatment is that the seeds produced are less numerous, but more plump and better ripened than they otherwise would be, and fully 70 per cent. of double flowers is obtained from seeds thus cultivated.

In the vicinity of Erfurt and Quedlinburgh are several large wholesale seedsmen, and among others may be mentioned Messrs. Bernary, Haage, and Schmidt, and Martin Grashoff, who not only grow large quantities of vegetable and flower seeds, especially of annuals, such as phlox, stocks, wallflowers, balsam, &c., but they also employ agents to buy up the produce of small growers, and prepare it for exportation. Nearly 50,000*l.* worth of flower and vegetable seeds were imported from Germany to this country in 1875, the value of the potatoes imported the same year being considerably over 48,000*l.* When we compare the area of the German states with that of France, it becomes a matter of some surprise to find that the value of the raw fruits sent to this country is so small, the value in 1875 being scarcely 50,000*l.*, while the value of the same kind of French produce for the same year was over 271,000*l.*

Description.	Value.				
	1871.	1872.	1873.	1874.	1875.
Raw fruit ..	£ 22,104	£ 60,122	£ 28,940	£ 38,520	£ 49,988
Potatoes ..	951	312,024	399,374	23,465	48,391
Seeds, other than farm or oil-pro- ducing kinds	24,163	44,182	63,060	56,794	53,363

It appears, however, that only a small proportion of the fruit grown in the German states finds its way to this country, since the main bulk of what is not consumed at home has a ready sale in the Russian markets.

The following extract, from an interesting article by W. Eser, in the 'Monatsschrift des Vereines zur Beforderung des Gartenbaues,' in Berlin, may be given as an illustration of German fruit culture as a profitable industry, and it also furnishes an illustration of the beneficial results that arise from small proprietorships.

"Werder, a small village and parish on the Havel, near Potsdam, is celebrated for the quality of its fruit, the greater part of which goes to the markets of Berlin. The total area of the parish is only 3494 *morgen*, about 2197 acres, whereof nearly 1000 (975) acres are devoted to fruit culture. This industry also stretches into several of the adjoining parishes, but Werder may be regarded as its centre. The natural soil in most places is very poor, and has only been brought to its present fertile condition by the indomitable thrift and

perseverance of its owners, not by capital. Thus these 975 acres are distributed among some 550 owners, so that each owner has on an average about $1\frac{3}{4}$ acres of land. The land varies in value considerably, ranging from 10*l.* to 40*l.* per *morgen*, or two-thirds of an acre. The average annual value of the produce of an excellently cultivated garden in a good situation for six years, not counting any failures, is given as about 21*l.* per *morgen*; but a ten years' average is somewhat less. After making the necessary deductions for labour, manure, &c., the nett profit of a garden 5 *morgen* in extent is estimated at 58*l.* 10*s.*

“The total value of the fruit crops of Werder varies, of course, according to the season. In 1875, a good season for nearly all kinds of fruit, something like 2,500,000 gallons of fruit were sent to Berlin, whereas in 1861, when very much of the fruit was destroyed by late frosts, the yield was only about 281,600 gallons. This includes all kinds of fruit, even tomatoes and medlars. The average prices of various fruits in a season of plenty (1875) are interesting: Cherries, per *tiene* (about 2·2 gallons), about 2*s.*; pears, 1*s.* 6*d.*; peaches, 5*s.*; plums (early and late), a little under 2*s.*; currants, about 1*s.* 9*d.*; grapes, 1*s.* 6*d.*; apples (1874), 1*s.* 3*d.*; apricots, 4*s.* 6*d.*; strawberries, 4*s.* 6*d.*, &c. The yield of a *morgen* in a certain garden is given as 264 gallons of cherries, 33 gallons of pears, 52 gallons of peaches, 132 gallons of plums, $4\frac{1}{2}$ gallons of apricots, 110 gallons of currants, 22 gallons of grapes, $6\frac{1}{2}$ gallons of strawberries, 176 gallons of apples, 2 gallons of raspberries, besides a guinea's worth of flowers and

asparagus. But the cost of labour and manure is rapidly increasing. A load of dung that cost only 15s. ten years ago, now costs 30s., and the annual outlay for manure cannot be reckoned at less than 3*l.* per *morgen*. In gathering time it is difficult to hunt up a sufficient number of hands to pick the fruit. The labourers receive 2s. and upwards per day, besides board, which amounts to 1s. 3*d.* more.

Cherries form the principal crop, and if these fail, the year is a bad one. They are exported widely, some of them reaching St. Petersburg. Peach-growing has also received considerable attention during the last thirty years, and enormous crops are obtained by watering daily with weak liquid manure.

Asparagus is one of the most important of all the vegetable crops grown in German gardens, and in the vicinity of Brauneschweig 25,000 acres are devoted to this crop, most of which is canned for home consumption, and for the Russian markets. The variety grown here is the *Rose de Holland*, a robust kind, excellent in flavour.

ITALY has a genial climate; as a gardening country it may be considered inferior to France, but superior to either Portugal or Spain in the higher branches of horticulture. Tuberoses, narcissus, and other bulbs, and camellias, have long been imported from Italy in considerable quantities; but the trade in these plants has now somewhat declined, large numbers of tuberoses being imported from America, while Belgian gardeners have obtained a monopoly in raising and propagating the camellia. The fruit-producing in-

dustries of Italy are of considerable importance, as shown by the following government return, and preserved or candied fruits and dried vegetables are also largely imported by our Italian warehousemen, who, on account of their intercourse with that country, introduced years ago many decorative plants.

Description.	Value.				
	1871.	1872.	1873.	1874.	1875.
Almonds ..	£ 26,564	£ 20,969	£ 13,737	£ 61,718	£ 24,950
Oranges and lemons	145,126	155,330	228,326	128,296	268,422
Mixed, preserved without sugar	11,084	14,270	22,573	11,250	21,361

SPAIN.—The gardening industry of Spain, and indeed that of many other parts of southern Europe, is much neglected, considering its splendid climate and close proximity to our colder and less fertile shores. Large quantities of grapes, melons, and preserved apricots are, however, imported by our large towns, as is shown by the following custom house returns.

Description.	Value.				
	1871.	1872.	1873.	1874.	1875.
Almonds ..	£ 75,800	£ 81,549	£ 50,400	£ 58,821	£ 63,478
Figs	4,759	12,061	20,125	1,844	5,049
Nuts	159,826	210,042	236,103	179,440	214,253
Oranges and lemons ..	404,565	531,417	495,819	501,566	659,438
Raisins ..	467,487	795,571	468,838	582,099	589,691
Miscellaneous, raw	48,788	115,840	168,523	132,483	163,358

The culture of melons is one of the most general of gardening occupations in Spain; and although poor and rich alike nearly live on the cooling fruit during the hot season, and large quantities are now exported to European markets, yet many tons of fruit are cut before they attain perfect maturity, and are hung up for winter use. An acre of irrigated land produces about 400 arrobas of melons, or say about 5 tons of fruit, and this at three farthings per lb. would be worth about 30*l.*, a calculation which gives some insight into the importance and profitable character of this industry; but it must be remembered that irrigated land in Spain is too valuable to be devoted to any one crop, and, growing amid melon plots, we find peaches, figs, pomegranates, grapes, and almonds.

Ornamental or art gardening generally does not reach a high state of perfection in Spain; but the balcony gardens in most of the large towns are deserving of notice, since perhaps in no other country is this phase of gardening seen to better or even equal advantage; graceful climbing and twining plants are draped around the pillars or balustrades, or hang in festoons from the old Moorish masonry (as shown in the engraving on page 244), while in some instances rich wreaths of living vegetation are suspended right across the narrow streets.

ALGERIA.—The late Mr. Giles Munby gives the following interesting particulars of garden industry in Algeria, in the 'Gardeners' Chronicle,' 1870, p 278:

"The gardeners who supply the markets are of

several nationalities, viz. French, Genoese, Arabs, Moors, Spanish, and Mahonese. Although the Mahonese are Spaniards from the island of Minorca, their



BALCONY GARDEN IN SPAIN.

system of gardening differs widely from that of the Spaniard of Valencia or Malaga, and it is they who

principally supply the markets near Algiers, the Spaniard, from the kingdom of Valencia, those of Oran, while the Genoese and Maltese have fixed themselves in the western provinces, near Bona and Constantina. Algiers depends on Spain in a great measure for its supply of early fruits and vegetables; for, although some degrees farther north, the coasts of Andalusia and Valencia ripen their produce quite a month sooner than Algiers. Thus the barley harvest rarely begins in Algeria before the middle or end of May, while barley is generally cut near Valencia in the middle of April. The Paris markets, and, through them, Covent Garden, are supplied with early vegetables from Algeria, potatoes being sent there in January, which are followed by green peas and artichokes a little later. I have gathered green peas in my garden near Algeria on Christmas Day, but they were planted in a sheltered situation on a southern slope, and they fetched 24 sous (1s.) a pound in the market. Hoar-frosts cause much injury to early vegetation, and they are frequent in early spring even on the coast; but they only last about half an hour before sunrise, and are always the prelude of a very hot day. The principal products are grapes, olives, oranges (including the Tangierine variety), melons, prickly pears, or Barbary fig, tomatoes, potatoes, cucumbers, onions, and artichokes.

PORTUGAL.—From Portugal we receive large consignments of fresh grapes, which arrive in good condition, packed firmly in large boxes, the packing material used being cork dust. Tomatoes and green-

fleshed or Cadiz melons are also sent to our markets in considerable quantities. Many inter-tropical fruit trees succeed well in sheltered parts of both Portugal and Spain, but in neither country are the immense natural advantages made the most of. Irrigation is one of the greatest aids to successful culture, but appliances of the kind are scarcely better than those used by the Moors many years ago. The importance of the Portuguese trade in fruits may be best seen in the accompanying table :

Description.	Value.				
	1871.	1872.	1873.	1874.	1875.
Almonds ..	£ 15,862	£ 12,748	£ 15,213	£ 21,651	£ 13,058
Figs	12,283	20,723	20,331	7,530	5,882
Oranges and lemons ..	130,298	126,030	130,756	194,699	148,141
Miscellaneous, raw)	56,104	116,512	96,598	80,801	89,275

From the Azores we obtain immense quantities of oranges and lemons; and it is curious to note, that while the money value of these in 1871 was 338,278*l.*, the imports of 1875 are only valued at 252,229*l.* The unenumerated raw fruits imported to this country from the same islands were worth, in 1871, 800*l.*, and in 1875 the value was 1930*l.* The imports of "fruit preserved without sugar" from the Canaries in 1871 were valued at 5639*l.*, after which a gradual decrease is observable, until in 1875 the total value is given as only 3192*l.* Fruits preserved without sugar are also

sent from Greece, and here again a decrease in value may be seen, from 8034*l.* in 1871, to 4312*l.* in 1875. The value of the imports of currants and raisins from the Greek islands in 1875 was considerably over 40,000*l.* The imports of dried fruits (other than figs and raisins) from Turkey proper have increased, since in 1871 we find the value given as 17,557*l.*, while in 1875 it was 31,221*l.* In 1873, however, the value was 43,680. From Turkey we obtain large supplies of figs and raisins, the collective value of which in 1875 was 630,074*l.* The total value of the figs, raisins, and dried fruits received from Asiatic Turkey in 1875 was 660,737*l.*, while European Turkey sent us raisins in the same year worth 548*l.* only; in 1871, however, the value is given as 8049*l.*

AMERICA.—The gardening, fruit-growing, and fruit-canning or preserving industries of America are deserving of especial notice; indeed, the North American continent has been described, and that by no means inaptly, as the "orchard of the world."

Mr. Quin estimates the strawberry crop of New Jersey state alone at 2,000,000 quarts, in favourable years, worth, at 16 cents per quart, 60,000*l.*; blackberries, raspberries, and grapes about as much more. The cranberry crop is estimated at 125,000 bushels of sound fruit, this being worth 60,000*l.* Cranberries form about half of the entire cropping of New Jersey state, and bring into profitable use thousands of acres of swamp land, which could not otherwise be utilized. Strawberries for the New York market are largely grown in North Carolina, whence comes the first fruit

early in May. These are dear; but in a week or so the Virginian fruit arrives, and then down come the prices. A week makes an enormous difference in the supply and prices. Thus, on a Saturday in May, Carolina fruit is scarce and dear, but on Monday a steamboat from the James river comes in with 1000 crates, each containing from 20 to 60 quarts of fruit. Another, say on Wednesday, brings 2500 crates, or 100,000 quarts, and another, on Friday, is laden with 5000 crates, making a supply of nearly 350,000 quarts.

A great range of climate and rich soil renders America peculiarly adapted for fruit culture, and especially for the perfect growth of that most noble of all fruits, the apple. Thousands of acres in the northern states are devoted to the growth of this fruit, and every year we obtain larger importations of the Newtown pippin and Baldwin varieties, the first being perhaps the best flavoured of all apples, and the latter one of the most handsome in colour. These apples cost about 6s. per barrel for transit from New York to London, and the best samples of the Newtown pippin variety realize from 20s. to 40s. per barrel, but of course much more if retailed in the shops. Immense quantities of the Bartlett pear (*William's Bon Chrétien*) are also grown throughout the states, and a few of these reach our markets in cans.

Texas is second to no other state in the Union, except California, as a grape-growing country. Wild grapes grow luxuriantly everywhere in woodlands, in the poorest and richest of soils; they are, too, less liable to disease than most fruit trees, and they seldom

or never fail in producing a crop. Post-oak grapes are plentiful and fruitful, not only yielding good food for man, but they drop when ripe, and feed the swine. After these come the winter grapes, tiny black berries, borne in large and thickly set clusters. Concord, Hartford prolific, Delaware, Herbemont, Ive's seedling, and Norton's Virginia are amongst the best cultivated sorts; and on Galveston Island, and the immediate Gulf coast, with some care, Rose Chasselas, Muscats, and Hamburgs are grown successfully and profitably. The white Scuppernong is reckoned the best grape for the south. In damp seasons, in the southern part of the state, the grapes often rot very badly. The Germans bestow considerable pains on the grape vines, and make a deal of wine, much more so than the Americans. Vines are raised from cuttings of three joints or so, but the Delaware and Scuppernong varieties are layered.

Pears, and the best seedling chickasaw or low-growing bush plums, do well even as far south as Texas. Pears in America are grafted on French pear stocks, or on the Angers quince, the cost of grafting being about 20s. per 1000. Budding is performed in September, and grafting during the winter. Apple roots are sometimes used as stocks on which to graft pear scions, and give a good and productive growth for a time; but they throw up suckers too freely and thus occasion much trouble.

Apples are grafted on seedling stocks, or on the French paradise stock during the winter, and are then kept in boxes of earth under cover until the spring.

Instead of raising their own stocks, the Brenham nurserymen buy them from Iowa city for 4 dollars per 1000, and each stock, by being cut up into 3 or 4-inch pieces, yields root enough for two to four scions. Bringing shoots and scions into a shed, they are whip-grafted at the rate of from 1500 to 3000 a hand per day; but over 2000 good grafts is hard work. By contract, $1\frac{1}{2}$ dollars per 1000 is paid. They neither wax nor tie apple grafts, but put them together tight enough not to require it. As soon as grafted, they are planted out, an advantage which the southern has over the northern grower, who has to keep them in sand or sawdust in cellars till the frost breaks up. If the season be a moist one, they usually go ahead splendidly, growing like willows; but if the season be dry, many grafts perish.

Peaches and nectarines are raised from stones, or the best known kinds are budded on seedling peach or plum stocks. The growers either save their own peach-stones, or buy them for a dollar a bushel as soon as they can be got; they then bed them in earth, in the ground, or in barrels, there to remain until planting time, say December or January, when they are sown in drills a pace apart. Stones from seedling trees are preferred to those from grafted ones, as they are reckoned to produce the thriftiest young plants. All being right, they grow apace, and are cultivated often. About September they are budded, and in a fortnight or so they are examined, and any failures are rebudded. In some of the states thousands of acres are under the peach crop, the trees being grown

as standards, and rarely trained to walls as with us. It may here be remarked, that wall culture for this delicious fruit is not absolutely essential even in England, since, in 1876, I saw a standard tree in a cottor's garden, at Cheshunt, bearing upwards of 1000 ripe fruits; and a sheltered orchard of such trees in Kent or Sussex would be a little fortune to their proprietor. The variety in this case was one of Mr. Rivers' seedlings (Early Louise). Peaches and nectarines are rarely raised from stones in this country; most of the varieties, indeed, have been imported from continental gardens, which may in a measure account for their requiring some protection in our climate. By raising seedlings in this country, improved and hardier sorts might be produced, and peach orchards become a possibility in the warm southern and home counties.

Orange culture has now become an important gardening industry in America, large tracts in Florida being devoted to this crop, and a large amount of capital being invested in their culture. The peninsular position of this state, and its equable climate, are well adapted for the cultivation of the fruit; and the almost fabulous returns which have already been realized are attracting numerous speculators, who hope to supply the home demands for oranges without the necessity for importing, and to make their own fortunes into the bargain. New York alone is said to consume five hundred millions of oranges every season; and as these are nearly all foreign produce, and many of them only half ripe, there is evidently room for a large

trade in the more fully developed home-grown fruit. It is said that green peas, strawberries, and tomatoes can be grown the winter through in the open air, in profitable union with the orange culture. The romantic character of American advertisements must be taken into consideration in reading this statement; but there is no doubt the capabilities of the state are far greater than has hitherto been recognized. Land sold eight years ago at a dollar per acre is now realizing 150 dollars; and an estate purchased four years ago at 25 dollars per acre, and planted with orange trees, was sold three years later at 1000 dollars per acre. The culture of plantains and bananas has also been in part successful in Florida, and choice vegetables, such as tomatoes, green maize, squash gourds, water melons, and sweet potatoes and Lima beans, are also obtainable in abundance. Tomatoes are extensively cultivated in New York and New Jersey states for canning, and the produce of the Bordentown and other growers has already obtained a place in our markets.

Of all the great divisions of America, however, California possesses the finest climate, and seems on the whole the most suitable for fruit culture and other branches of gardening industry. During the summer months very little rain falls, and irrigation is practised by vegetable and strawberry growers. Strawberry plantations are generally located on lowlands, near a stream, which is used for irrigating purposes from April onwards; and by removing all runners from the plants, ripe fruit may be gathered for six months of

the year. The only fruit trees which require watering are the oranges, and in Los Angeles county, the extensive orange orchards are regularly irrigated during the hot weather.

Orange culture in Los Angeles county is now an established and profitable culture. One grower in San Gabriel sold his fruit ungathered for 30 dollars per 1000, his grove of 5 acres containing 500 trees, and taking the low estimate of 1000 fruit per tree, the crop is worth 15,000 dollars; and 3000 dollars per acre is a large return for land, even in this favoured climate. An acre of rich sheltered soil in southern California, if near the railway track, is worth as much for orange or banana culture as twenty or thirty acres in the eastern states under ordinary crops.

The gardening industries of California, although already enormous as compared with our own, are rapidly becoming extended, since fruit and vegetable growing for the San Francisco markets are found to be a more remunerative speculation than corn-growing or cattle ranches. Establishments for the preservation of fruit by canning and drying processes are rapidly springing up in all directions, many of the growers finding it advantageous to be independent of the home markets. Improved machinery of various kinds has of late years been introduced for drying fruits and vegetables. One of the most expeditious of all the systems of drying is that known as the "Alden process," by which the fresh fruit of to-day is thoroughly dried and fit for packing and exportation to-morrow. Many other appliances are used in the fruit-preserving

industries, but the "Alden" is the best, and equally applicable to peaches, apricots, plums, apples, figs, pears, strawberries, blackberries, and grapes. By the intelligent use of the various methods of canning, drying, and preserving in sugar or syrup, or candying, no fruit need be wasted, as what is not required for the home supply is readily shipped to Europe, and that at a wondrously cheap rate, owing to the rivalry between the various steam-packet companies. Grape culture for wine and raisin making is already a staple industry in California, and most of the vineyard proprietors not only grow but also manufacture their own produce, since this is found to pay better than selling the ripe fruit to the agents employed in buying up grapes for manufacture by speculating vintners. In the city of Baltimore 17,000,000 cans of peaches were "put up" in 1875. There are forty or fifty firms engaged in this canning trade in Baltimore alone, and these employ about two thousand hands, principally women and girls. Muscat, muscadine, and other European varieties of grape grow well in many parts of California, although they fail in the northern states of the Union, where the varieties raised from the native vine are found to succeed best.

One little fact in connection with Californian horticulture is worthy of notice, namely, the successful gardening industry established by the Chinese emigrants, who produce the best of vegetables and fruits, and have obtained a monopoly of the sale of these products in some quarters of San Francisco.

San Francisco and other Californian and western

markets are well supplied with blackberries, a fruit rarely grown in England, and never for profit, since we trust to our wild supply. The American variety (*Rubus fruticosus*) has been much improved by cultivation. Seven miles from Napa, on the Napa Valley railroad, Messrs. Trubody have a blackberry garden of 15 acres, holding 10,500 plants or bushes. These are staked and trained up 6 feet in height, the varieties being Lawton, early Wilson, Missouri, Mammoth, and Dorchester. The fruit is picked by Chinese labourers, each gathering about 30 lb. per diem; the greatest quantity picked in one day being 4500 lb., for wine-making. The fruit is picked in drawers, each of which holds 5 lb. of fruit, and these are placed in chests holding fifteen to twenty each, and sent to market twice daily, morning and evening. Many thousands of acres of moist land in New Jersey and other American states are devoted to the growth of cranberries, of which hundreds of tons are preserved by canning for the European and other markets, apart from the enormous quantities consumed at home.

The nursery and seed trade of America is an extensive one, owing partly to the fact that land is easily acquired and cultivated, and the business in small ready money orders is greatly assisted by the postal arrangements, which are much superior to our own in the facilities offered for the transmission of plants and seeds. American nurserymen are large importers of new plants and seeds from Europe, and to a certain extent this branch of trade has now become a reciprocal one. In a great fruit-growing country like America,

the trade in young grafted and other fruit trees is, of course, large ; but many of the growers buy stocks and graft their own trees, an operation generally left to the nurserymen in England, and this is undoubtedly one of the greatest drawbacks to the general planting of fruit trees in this country. As an example of the enormous scale upon which the cultivation of fruit trees is carried on in the United States, it may be mentioned that a recent State return shows, that in 1873, 334,067 acres in Illinois alone were occupied by orchards ; while according to a Blue Book return, published a short time since, the orchards of Great Britain only covered 154,584 acres, being less than half the return for one American state. The United States commenced commercial nurseries about 1791, and from 1810 to 1820 had perhaps 200 acres. According to 'Moore's Rural,' it may now be estimated that 500,000 acres are devoted to commercial fruit-tree growing in the United States.

Although America possesses a great range of climate, and a range well adapted for the luxuriant growth of a larger variety of fruits than almost any other country, yet it must not be supposed that there are no drawbacks to gardening industry. On the other hand, bad seasons occur not unfrequently, and the American fruit-grower has to battle with myriads of insect pests, or "bugs," of the devastating influence of which, in a hot summer, our own growers have but little idea.

The internal consumption of fruit and vegetables in America is enormous, as are the exports to this country. In 1871 the value of the raw fruit sent to England

was over 40,000*l.*, while in 1875 the value was nearly 86,000*l.*; but the supply is a variable one, since in 1872 we received 159,000*l.* worth, and the imports to our markets during 1876 seem much larger than ever, this being due to the partial failure of our own apple crop. The following table shows the total value of raw fruit as imported during the last five years.

Description.	Value.				
	1871.	1872.	1873.	1874.	1875.
Raw Fruit	40,604	159,787	112,393	86,547	85,874

Mr. Edward Sprague Rand, jun., writing from Boston, Mass., kindly gave me the following particulars respecting the fruit trade in his locality, under date December 19, 1875.

"Baldwin apples are a drug in the market. I can buy the best for about 6*s.* per barrel, delivered, and on my farm we are feeding cattle with them or making them into cyder for vinegar. The Newtown pippin is not grown in the New England states; it is a New York apple, and is chiefly grown for export to England. The principal New England apples grown for sale are, in their respective seasons, Williams red, Astrachan, Porter, Gravenstein, Halbardston, Nonsuch, Rhode Island greening, Danvers winter sweet, Baldwin, Blue gillflower, and Roxbury russet. Fruit culture is carried on here on an immense scale. Outdoor grapes from the west have sold all the summer for 2½*d.* per

pound; now they are double that price. Potatoes are very high, the Nova Scotia and Early Rose varieties realize 14s. per barrel; indeed, in this vicinity, between excessive drought and the Colorado potato beetle, the crop has been a failure. The vicinity of Boston is the finest pear-growing region in this country. The Californian pears, with which our markets are now abundantly supplied, are very beautiful, but not highly flavoured. Californian, flame-coloured, Tokay, and Malaga grapes are abundant on street stands at from 10d. to 1s. 5d. per lb., lemons 7½d. per dozen, Mediterranean oranges 10d. per dozen; but the large Florida oranges realize 2s. 6d. per dozen. The chestnut, native and Spanish, and peanut roasters are seen everywhere. Bananas are just now rather scarce, but from April to September the market is abundantly supplied with both the red and yellow in many varieties, the retail price varying from 1s. to 3s. per dozen. Pines were very plentiful during the past summer at 20s. per hundred, and in addition to all these we have many kinds of berries, peaches by the cartload, plums, apricots, and nectarines."

CHINA AND JAPAN.—Gardening had its origin in the East, and it is interesting to find that the Chinese and Japanese are the most skilful of all modern Eastern gardeners, the cultural arts having been preserved and practised by them for centuries. The principal imports from China of horticultural interest are litchees and preserved "kumquats," or fruit of "*Citrus japonica*," a small variety of orange having an agreeably sub-acid pulp, and a delicately perfumed rind or

skin. Ginger, or the fleshy rhizome of *Zingiber officinalis*, either in a raw or candied state, is another product which finds its way to our markets in considerable quantities. Some of the most beautiful of all our greenhouse flowers are natives of the Celestial Empire, the most remarkable imports in this way being the camellia (a near relative, by the way, of the plant from which the tea of commerce is prepared), azalea, chrysanthemum, Chinese primrose, dielytra, and tree peonies. The last-named plant is said to have been a popular garden flower in China for the last fourteen centuries. It is a curious fact that the Chinese gardeners do not esteem the productions of our florists so much as we esteem theirs, since Mr. R. Fortune tells me that on his second visit to China, he took out seeds and plants of many of our most beautiful flowers, but none interested them as being in any way remarkable, except some scarlet pelargoniums, which they prized very highly.

From Japan we have during the last twenty years received immense importations of lily bulbs of various kinds, of which the golden-rayed lily of Japan (*L. auratum*) is perhaps the best known example, and of this species alone many thousand roots are imported every year, as also are those of its allies, *L. callosum*, *L. Thunbergianum*, *L. tenuifolium*, *L. Browni*, *L. speciosum*, and other well-known kinds. Many of the most distinct and beautiful of our evergreen conifers and variegated shrubs have been imported from Japan during the last half century.

Both China and Japan are well populated, a fact

which accounts in a great measure for their slender exports of fruit, of which they possess several but



DWARFED JAPANESE PINUS.

little known in Europe. Among these may be mentioned litchies (the fruit of *Nephelium litchi*), a

light thin-shelled fruit, having a sweetish pulp. These may be seen in Covent Garden, where they realize 4s. per pound. Apricots are plentiful in China, as also are strawberries, grapes, and oranges of many kinds. In Japan one of their most handsome fruits is the "kaki" (*Diospyrus kaki*), a fruit the size of our apples, but having the bright scarlet colour and somewhat the texture of the tomato, while its flavour is similar to that of a perfectly ripe apricot, only that a peculiarly astringent after-taste is left in the mouth. Of this fruit the Japanese have numerous varieties, the best of which they carefully graft on the common sorts as stocks. Some distinct and beautiful varieties of the Chinese quince are also much cultivated. It is singular to find that the Japanese gardeners do not appreciate our finest pears and plums, but grow inferior races of their own in preference. Their pears are mostly varieties of *Pyrus japonica*, a mottled fruit, but rather hard and astringent.

The passion for possessing miniature or dwarfed trees and shrubs of various kinds may be mentioned as one of the traits peculiar to Chinese and Japanese gardeners, who take great trouble in producing them. A dwarfed umbrella pine (*Sciadopitys verticillata*), like that shown in the accompanying engraving, has taken ten or twelve years to bring it to a state of perfection; and although scarcely 16 inches in height, it has the proportionate characters of a full-sized tree; and such examples are very expensive, being eagerly bought by rich Japanese amateurs for the decoration of their dwellings.

COLLATERAL INDUSTRIES OF GARDENING.

HORTICULTURE differs from all other industries, in being more largely followed by amateurs for recreative purposes; hence it need be a matter of but small surprise to find that the money spent in gardening as a recreative science—or as one of the most general of all the decorative arts—if not quite so much as is spent in pictures, old china, or other “hobbies,” is as much or more than that expended in the more practical branches of fruit and vegetable culture for market. It is nothing uncommon to find gardens in the suburbs of all our large towns, and especially in the manufacturing districts of the north, containing hot-houses and conservatories, which have cost from 1000*l.* to 10,000*l.* or even more, these being in many cases stocked with rare plants, on which have been spent in some cases an equal sum, and in others, half or a quarter of that amount. Even at the present day, some traces of the tulipomania of the old Dutch florists seems to linger among our amateur growers of the tropical orchids, who not unfrequently pay 20 guineas to 50 guineas for a single specimen of any rare species. Many years ago the Duke of Devonshire paid Mr. Cuming 105*l.* for one of the two plants of *Phalænopsis grandiflora*, brought by that collector from the Philippines; and more recently (April 8th, 1875) Lord

Londesborough paid a like sum at Stevens' auction rooms for an exceptional plant of the Indian *Dendrobium Wardianum Lowii*, the total value of the imported orchids sold on that date in one day being 1500*l.* One of the most valuable collections of orchids, palms, and other tropical plants perhaps ever seen in this country, was that collected at Manley Hall, near Manchester, a portion of which, when sold by public auction a year or two ago, realized between 4000*l.* and 5000*l.*, a sum much less than the original cost to the owner, to say nothing of nearly 200*l.* per week, or say 10,000*l.* per year, in cost of skilled labour, fuel, and cultural appliances necessary to their welfare; indeed, many private gardens in this country cost from 5000*l.* to 10,000*l.* per annum in labour and material alone, and the larger public gardens still more.

The following are a few of the choicest plants sold at the Manley Hall sale, with their prices. *Saccolabium guttatum superbum*, 46*l.*; *Cypripedium Stonei*, 38*l.*; *Aërides Veitchi*, 24*l.*; *A. Schroderi*, 23*l.*; *Nepenthes sanguinea*, 50*l.*; *Cocos Weddelliana*, 63*l.*; a smaller specimen, 42*l.*; *Geonoma Seemanii*, 32*l.*; *Anthurium Scherzerianum*, 44*l.*; a still larger plant, 46*l.*; *Gleichenia flabellata*, 40*l.*; *G. Mendeli*, 32*l.* Besides these prices for well-developed plants, smaller or less rare examples readily sold for prices varying from 10*l.* to 20*l.* each. At another celebrated auction sale of orchids, that at Meadowbank, near Glasgow, a plant of *Lælia anceps Dawsoni* realized 46*l.* A distinct white sepalled variety of the old *Cypripedium insignæ*, 23*l.*; *Cattleya Ezoniensis*, one of the most beautiful of all

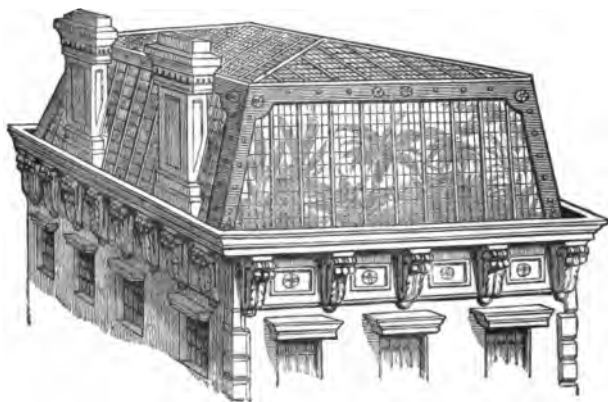
hybrid orchids, 32*l*. The total sum received for about six hundred lots was something over 2000*l*.

It should be borne in mind that all the prices quoted above are those obtained at public auction sales, many of the plants having been purchased by Messrs. Veitch and Sons, and other nurserymen, and these prices may serve as some guide to the immense sums which change hands yearly in this country for ornamental plants, to say nothing of the many thousands of pounds expended in the seeds of the common decorative plants of our town and suburban villa gardens.

As I have before suggested, the appliances in the way of hot-houses and other structures, heating apparatus and fuel, devoted to the cultural departments of gardening industry, represent an enormous amount of capital, and in themselves are sufficient to give employment to a whole army of carpenters, glaziers, iron-founders, fitters, and bricklayers. The principal firms of horticultural builders employ from twenty to one hundred and fifty regular hands, besides an extra number when necessary to the due fulfilment of extensive contracts; and their workshops are in most cases fitted with the best machinery for sawing, planing, and drilling, so as to save time and cheapen the cost of production as compared with the old systems of hand labour. One firm of hot-house builders at Paisley employ one hundred and fifty workmen, and the gross amount of wages paid in 1876 was 11,000*l*.; the value of the timber used varies from 3000*l*. to 4000*l*. yearly, and that of the heating apparatus and

iron fittings is about 4500*l*. The value of the stock-in-trade is 16,000*l*., and the workshops, which cover an area of one acre, are exclusively devoted to the manufacture and fitting of hot-houses and heating apparatus. The improved machinery in this establishment alone is computed to perform the work of one hundred and fifty hands, and the total area of workshops, fitting sheds, timber yard, &c., is nearly 4 acres.

Dr. B. W. Richardson, F.R.S., recommends the construction of plant houses or conservatories, instead



A HOUSE-TOP GARDEN.

of the ordinary opaque roofs of town houses, and this idea, if carried out generally, would give another impetus to the horticultural building trade. Mr. Barr, of 12, King Street, Covent Garden, has a whole range of hot-houses on the top of his premises, and there are other examples in London and elsewhere. This idea,

if well carried out, would enable the denizens of our crowded cities to enjoy somewhat of the freshness of a garden, however restricted such an one must of necessity be.

During the past twenty years the horticultural building trade has increased rapidly, and still continues prosperous at a time when inactivity is evident in many other industries. The question of fuel is a most important one in relation to horticultural industry in this country, and the rise in the price of coal did, when at its height, threaten to restrict the growth of tender plants of all kinds, although the same cause fortunately did good service in inducing many amateurs of limited means to take up the culture of hardy fruits and flowers. Our immense natural wealth in the way of coal and other fuel is certainly one reason why we stand at the head of all northern and temperate countries in the culture of rare exotics, and in the production of choice fruits of all kinds.

There are few other recreative or fine art industries which give rise to the production and investment of wealth in a more agreeable, and at the same time beneficial manner than horticulture, since, while it is most independent of nearly all other industries in some of its more simple phases, it seems naturally, when pursued on a large scale, either for pleasure or profit, to draw into its vortex nearly all other collateral arts and sciences. Chemistry is called in for manures, and in the preservation of gardening products; pottery and glass-ware for the growth and artistic arrangement of all decorative and most useful plants. One manu-

facturer of garden pottery, Mr. John Matthews, of Weston-super-Mare, informs me that 1,282,000 flower-pots and vases were made by him in 1876, the sizes varying from $1\frac{1}{2}$ inch to 30 inches in diameter. The paper making and printing industries are largely called upon for wrappers, bags, and packing materials, labels, and catalogues, while literary and artistic labour is requisite in the production of our now somewhat voluminous gardening literature, which boasts four journals, having collectively a circulation of about 30,000 copies per week. One weekly, and two or three of the monthly gardening periodicals, in addition to high literary ability, are illustrated with wood engravings, and one or more coloured plates each, thus occasioning a demand for water-colour artists and colour printers.

The following are the principal horticultural periodicals now published in England :

Weekly.

- Gardeners' Chronicle (wood engravings).
- Garden (wood engravings and coloured plate).
- Journal of Horticulture (wood engravings).
- Gardeners' Magazine (wood engravings).

Monthly.

- Botanical Magazine (6 coloured plates).
- Floral (4 " ").
- Floral World (1 " ").
- Florist and Pomologist (2 " ").
- Gardener (wood engravings).

One of the oldest of all the periodicals connected with horticulture now extant in this country is the

'Botanical Magazine,' of which a hundred volumes have been published, containing upwards of six thousand original plates. The 'Botanical Register,' 'Paxton's Flower Garden,' and 'Magazine of Botany,' 'Loddige's Cabinet,' 'Florist,' 'Maund's Botanic Garden,' 'Sweet's Flower Garden,' &c., are other periodicals which collectively contain some thousands of coloured plates of garden plants. The 'Transactions of the Horticultural Society of London,' of which some ten or twelve volumes were published, also contain many plates of fruits and flowers, together with essays contributed by the most noted horticulturists and botanists of the time. The total cost of these 'Transactions' is said to have been upwards of 40,000*l*.

England stands at the head of all other countries in the matter of garden literature, Belgium and America being about equal. Since 1830, nearly 60,000*l*. have been expended in Belgium alone on gardening literature, of which the following is a rough estimate.

	Plates.	£
Herbier de l'Amateur	600	3,200
Flore des Serres, by Drapiez	231	1,400
Encyclographie	211	1,200
Sertum	600	4,000
Horticulteur Belge	116	1,000
Magasin d'Horticulture .. .. .	..	60
Journal d'Horticulture Pratique	280	1,600
Annales de Gand	310	3,000
Flore des Serres	2261	17,600
Jardin Fleuriste	430	2,000
Nouvelle Icon. des Camellias	576	2,400
Belgique Horticole	781	8,000
Hortus Lindenianus	13	260
Pescatorea	50	1,000

	Plates.	£
Illustration Horticole	844 ..	9,000
Plantes Ornementelles	60 ..	200
Revue de l'Horticulture Belge	24 ..	40

These works collectively contain upwards of seven thousand coloured plates, but they are of very unequal value. Many of the earlier ones were copies of the 'Botanical Magazine' and 'Botanical Register,' and other English and French plates. The 'Belgique Horticole,' the 'Flore des Serres,' the 'Illustration Horticole,' the 'Revue de l'Horticulture Belge,' the 'Bulletin d'Arboriculture,' are all in their way well-conducted and most useful periodicals. France and Germany, although both great gardening countries, are strangely deficient in periodical literature devoted to the subject; yet the French standard works on horticulture are almost as numerous and far better illustrated, as a rule, than our own, especially in the case of delicate chromo-lithography and wood engraving. Spain and Italy are deficient in gardening literature of all kinds. Singularly enough, the Chinese, but more especially the Japanese, possess many well-illustrated books, some few of the wood engravings being delicately coloured by hand.

Much type and colour printing and wood engraving are now called for in the preparation and illustration of the trade catalogues issued by our principal nurserymen, and one rather extensive firm of printers devote themselves almost exclusively to this work. Of all nurserymen, perhaps Messrs. Vilmorin-Andrieux, of Paris, have expended the most capital in the prepara-

tion and illustration of trade catalogues, the wood engravings of plants, flowers, and vegetables contained in their numerous trade lists being not only faithful, but most artistic in execution. Another continental nurseryman, M. Ernest Benary, of Erfurt, has just commenced an expensive periodical devoted to coloured illustrations of new or valuable varieties of vegetables, and M. Van Eaden, of Haarlem, a noted bulb merchant, has for some time published a monthly magazine devoted to coloured figures of new or desirable bulbous plants. In America, Messrs. James Vick and Co., of Rochester, New York, have also taken pains in the publication of illustrated catalogues and seed lists, as also in the distribution of chromo-lithographs of choice flowers. These are, however, but a few of the signs which show that trade horticulturists are every day becoming more active in developing those collateral arts, which best aid them in extending their trade relations at home and abroad.

One of the most important collateral industries in connection with our present subject is the manufacture and sale of tools, implements, and horticultural materials and appliances of various kinds. Tools of the more common-place kinds, such as spades, forks, hoes, &c., are manufactured by Birmingham firms, Messrs. Hughes and Messrs. Parkes and Co. being the principal. Garden rollers, mowing machines, and garden engines, &c., are principally cast at Leeds or Birmingham, and are then fitted by the inventors. Ironmongers and tin workers supply watering cans, syringes, and minor implements in great variety;

manufactured manures of various kinds, guano and bone-dust, are supplied by the agricultural chemists.

The solitary item of manure alone is said to cost the market gardeners of Paris 65,120*l.* every year, their implements, materials, and general stock-in-trade being valued at about 430,000*l.*, the total receipts of the market gardeners being something over 600,000*l.* annually.

Among the materials annually imported to this country almost solely for gardening purposes, we may notice some 400,000 bast mats from the port of Archangel alone, others being sent by way of the Baltic and Black Sea, the total being about half a million. This mat-making industry is mainly a domestic one in Russia, the material used being the inner bark of the common lime tree. In 1871, the value of the mats imported to Europe was over 50,000*l.*

Directly and indirectly, gardening industry is beneficial, as affording employment to thousands of persons, head gardeners and their assistants, labourers, artisans, and others, to say nothing of an immense number of extra hands, principally women and children, who are employed in gathering fruit and vegetables during the summer months. In our best market gardens we frequently find three to five hands per acre, and in nursery gardens of course the rate is much higher; indeed, gardening is, of all forms of land culture, that which affords the best market for labour, whether skilled or otherwise. Messrs. Crosse and Blackwell inform me they employ regularly over a thousand hands, and from three to four hundred extra labourers, chiefly

women, during the fruit season, the annual amount of wages paid by this one firm alone being 50,000*l.*; this expense for labour is necessary to the due preparation and distribution of 1500 tons of fruit, and 10,000 hogsheads (500,000 gallons) of fruits and vegetables in a preserved state, either as pickles or sauces; and among the ingredients necessary for this wholesale conservation, we note 1200 tons of sugar, and about 500,000 gallons of vinegar, the latter being prepared by the firm at their own brewery. The consumption of corks, pepper, wire, paper, and wood for packing cases, is proportionately great, to say nothing of show-cards and the hundred little requisites of such an extensive business. We are not told the sum paid for the glass bottles and porcelain jars in which these preserved fruits and vegetables are packed previous to their distribution, but it must be something considerable.

Extensive as is the fruit preserving and pickling industry in this country, our American neighbours are ahead of us in the matter, and, thanks to their rich and almost boundless tracts of alluvial lands, they are enabled to supply half the world with canned fruits and vegetables of excellent quality and at a cheap rate. It has been estimated that of cucumbers alone, 100,000 barrels are pickled annually in the United States, these, on the average, being worth 4*l.* per barrel; if those put up in jars with vinegar and spices be included, it gives a total value of 400,000*l.* for this one product alone, to say nothing of tomatoes, green corn, cranberries, Bartlett pears, blackberries, apples, and

other fruits, and the thousands of tons of apples, pears, plums, and vegetables now preserved by the Alden and other desiccating processes.

Among the products of our gardens, and those of the Continent, it is singular to find that vegetable marrow, melon, and other cucurbitaceous seeds form the basis of the so-called sugared almonds of the confectioners. In China the seeds of the water-melon are very largely used as food, just as are the seeds of *Araucaria imbricata* by the Chilians, and the seeds of the common stone pine in some parts of Italy.

Great as are the demands made on other arts and manufactures by gardening in England, our fruit and vegetable growers do not as yet employ a distinct service of trains or steamboats in the transit of their products, as is the case in America, where fruit trains run morning and evening into all the large cities, just as milk and fish "specials" do with us. From the Maryland and Delaware peach orchards alone, in 1875, there were shipped 4,000,000 bushels of peaches, 20 per cent. of which are canned for exportation, exclusive of those made into peach brandy or canned for home consumption by the growers. Well-ventilated cars are especially constructed for the conveyance of fruits, and the manufacture of glass jars, cans, fruit boxes, and packing cases gives employment to many thousands of artisans. The export seed trade of Germany and the south of France likewise either directly or indirectly affords employment for thousands of persons every year.



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